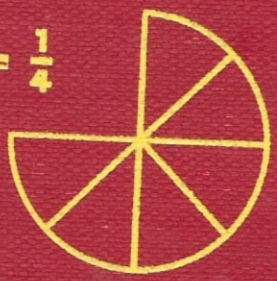
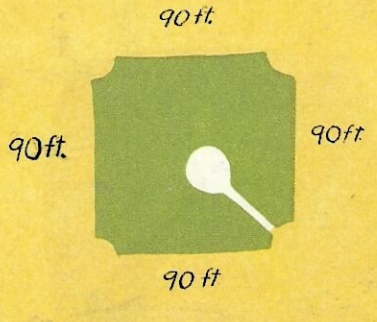
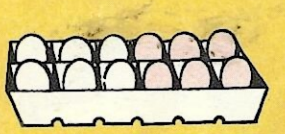
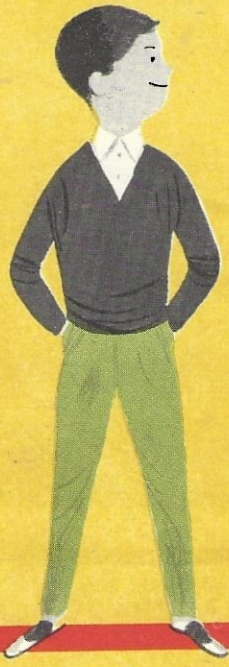
EXPLORING Arithmetic

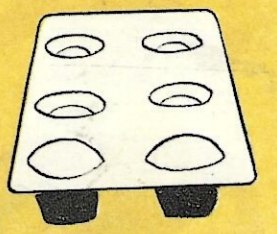
$\frac{2}{8} = \frac{1}{4}$

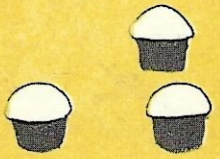












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EXPLORING

Arithmetic

JESSE OSBORN ADELINE RIEFLING HERBERT F. SPITZER

Prepared with the assistance of Lloyd L. Smith

Illustrated by Aline Cunningham, Obata & Associates, and Nancy Murphy

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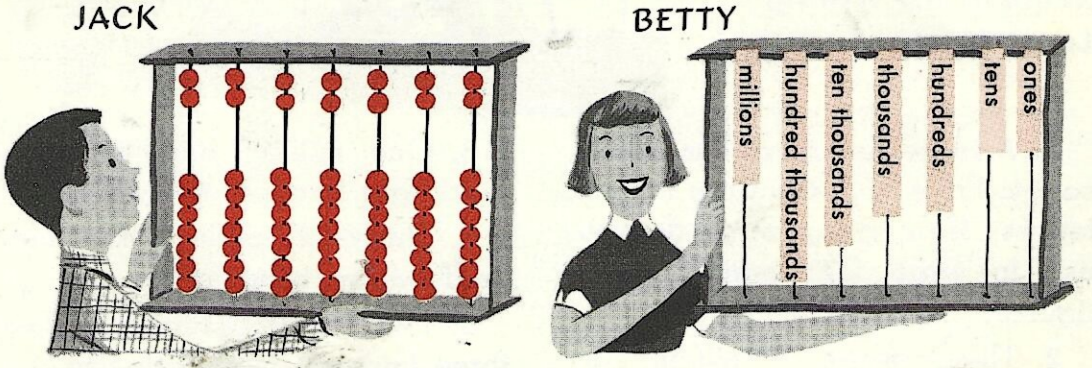
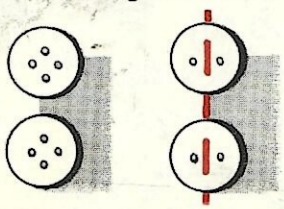


Different Ways of Showing Numbers

1. Jack is visiting a museum. He is looking at an abacus which the Persians used about 1000 years ago. What number is shown on the abacus?

2. How is the zero in 2013 shown on the abacus?

3. Later Jack made an abacus. He used a wooden frame. He put buttons on a string like this:



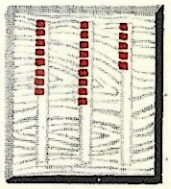
4. How many strings did he put on his abacus? How many buttons has he pushed to the top of each string?

5. The strings on an abacus show the place value of a marker. Betty named the places on her abacus. Begin with ones. Read the places. Think of these places. Read the number Jack is showing on the abacus he made.

6. Look at these numbers. Compare the way we write them with the way Jack showed them on his abacus.

2 — two ones
20 — two tens, or twenty
200 — two hundred
2,000 — two thousand
20,000 — twenty thousand
200,000 — two hundred thousand
2,000,000 — two million

7. Long ago most merchants used counting boards to figure problems. This was a board, with grooves like abacus lines and stones as counters. What number does this board show?



Reading and Writing Large Numbers

1. A large American elm tree is said to have more than five million leaves. How many zeros do you use to write that number with figures?

2. There were 1 million, 34 thousand people injured in automobile accidents in one year. Write this number using figures only.

3. The post office department reports that many packages are poorly wrapped for mailing. These are easily damaged. Each year about 1,500,000 packages are damaged in the mail. See if you can read this number correctly. The chart below will help you.

Number Reading Chart		
millions	thousands	ones
265	324	178

4. Three ways of writing numbers are used in problems 1, 2, and 3 above. Name the three ways.

Write these numbers in figures.

5. Three hundred six thousand, nine hundred.

6. One million, forty-six thousand, four hundred thirty-five.

7. Thirty-six million, one hundred twenty thousand.

8. Two hundred fifteen million, three hundred thousand, five.

Write these numbers. Use figures only.

9. 71 million, 915 thousand.
10. 328 million, 500.
11. 1 million, 827 thousand, 462.
12. 2 million, 2.

Write these numbers in words.

13. 4,300,328
14. 84,000
15. 437,001
16. 500,815,005
17. 637,000,000
18. 5,000,050

Be a Long Number Hunter

Look in newspapers, books, and magazines. Find numbers having five or more figures. Write these numbers. Bring them to class for others to read.

Facts About Our Numbers

𝍸 = 5 ones

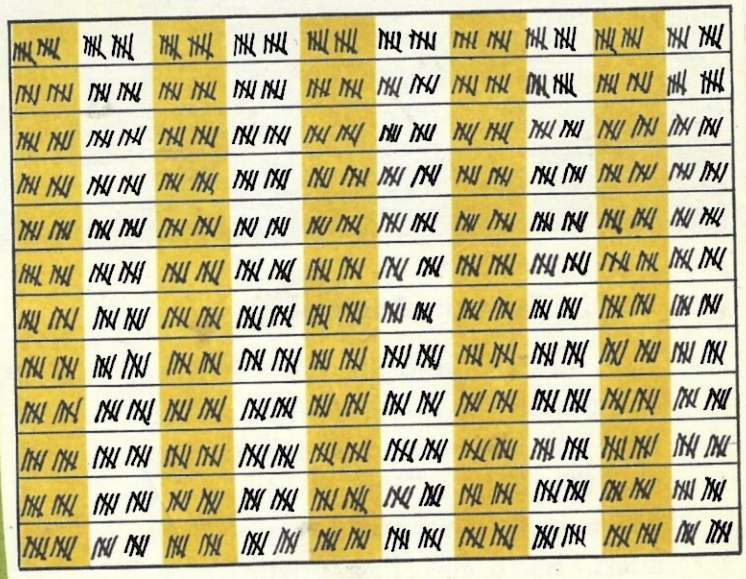
𝍸 𝍸 = 10 ones

10 ones = 1 ten

10 tens = 1 hundred

10 hundreds = 1 thousand

Chart Showing 1200 Strokes



1. The strokes in the boxes above are arranged in tens (pairs of 5's). How many tens are needed to show one hundred? One hundred sixty? One thousand is equal to how many tens?

2. How many strokes are there in the top row of the chart? How many rows equal six hundred strokes?

3. Place a paper so the first two hundred strokes show. Then show the next three hundred strokes. In all, how many strokes have you shown? How many are 200 and 300?

4. How many strokes are needed to show one thousand two hundred?

5. How many figures are needed to write one thousand?

6. How many markers will you need to show one thousand on an abacus?

7. Read the places on this place-value frame. What number is shown on line A? Line B? Line C?

	thousands	hundreds	tens	ones
A	/		////	////
B	////	//		
C		//		////

8. How many marks are needed to show eight hundred forty on the place-value frame?

9. Ninety-five tens equal what number? What number equals one hundred twenty tens?

ALICE		BOB		CARL	
48 →	48	65 →	65	76 →	76
+19	+19	+97	+97	68	68
67	17 partial sum	162	12 (5+7)	+97	+97
	5 partial sum		15 (60+90)	241	21
	67 sum		162		??
					???

Partial Sums in Addition

1. Alice added 48 and 19. Then she added the numbers again. This time she showed each addition as she thought it. That is, she wrote down part of her sum, or a **partial sum**. Read her first partial sum. How did Alice find this number? Bob's addition may help you.

2. Alice's second partial sum is 5. Does this stand for 5 ones or 5 tens? Look at Bob's work if you need help.

3. What should Carl write as his second partial sum? What will Carl think to find his second partial sum?

4. How did Alice, Bob, and Carl show that there are no ones in the second partial sum?

▶ Use partial sums to add the numbers in examples 5-10. Check your sums by adding the regular way.

5. 32 +46

6. 96 +45

7. 87 +73

8. 51 +19

9. 46 85 +39

10. 34 48 +30

11. Bill said he had 2 to carry in example 9. Did he mean 2 ones or 2 tens?

12. Look at Bill's addition check for example 6. What mistake did he make?

BILL	
ADDITION	CHECK
96	96
+45	+45
11	131 ✗
13	
141	

▶ Copy. Add. Check by showing partial sums.

13. 68 +74

14. 45 +86

15. 49 +59

16. 58 36 +87

17. 96 57 +98

18. 89 73 +57

Adding Three Ways

RALPH

ADDITION	MARK-OUT CHECK	
	Getting Ready	Adding
34	~~34~~	~~34~~
48 } addends	48	48
30	30	30
+79	+79	+79
191 sum	~~191~~	~~191~~
	34	34
		191

Ralph used the mark-out check for this addition. In the mark-out check, cross or mark out the top addend and the sum. Next write the top addend below the sum. Then add the numbers not marked out.

1. What makes the mark-out check a good check?

▶ Copy. Add. Use the mark-out check to check the sums in row 2. Check the sums in row 3 by using partial sums.

2.	83	67	18	68
	38	92	29	39
	+46	+85	+35	+47
3.	20	56	14	43
	55	17	20	27
	+83	+28	+96	+58

Bill had trouble with some of the examples. He had forgotten how to add such numbers as 13+6 and 17+5.

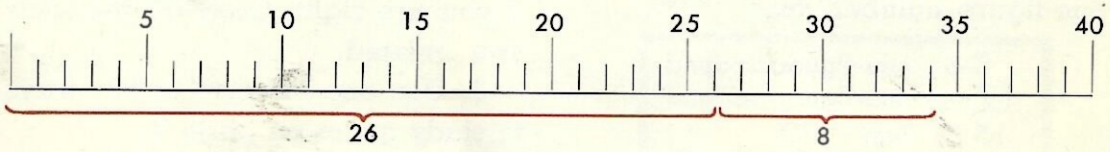
4. Which of these 3 ways of adding 13 and 6 do you like best?

THINK: 13+6=19.
THINK: 13 is 10 and 3. 3 and 6 are 9. 10 and 9 are 19.
THINK: 3 and 6 are 9. Then, 13 and 6 are 19.

5. The drawing below shows 26 and 8 added on a number line. Explain this addition.

6. Draw a number line. Show 17+5.

7. On another number line show 29+6.



Learning Important Addition Questions and Facts

If you have forgotten the answers to some of the important addition questions, you will not add well.

▶ See how well you know them. Answer these as fast as you can read them.

1.	5	6	5	9	3	8
	+7	+9	+6	+9	+9	+6
2.	9	4	9	7	3	9
	+8	+9	+6	+7	+8	+4
3.	7	8	9	6	9	7
	+5	+5	+2	+7	+3	+6
4.	8	7	8	7	8	6
	+7	+4	+3	+9	+9	+8
5.	9	7	2	4	5	9
	+5	+8	+9	+8	+8	+7

Study the addition fact for any of the questions you did not answer quickly.

■ **An addition fact is an addition question and its answer.**

Page 321 gives the basic addition facts. In basic addition facts a one-figure number is added to a one-figure number, as:

8 ← one-figure addend
+7 ← one-figure addend
15 ← sum

6. Why are basic facts called "basic"?

▶ Use folded paper. Write sums.

7.	6	5	3	8	4	7
	+3	+2	+5	+1	+6	+2
8.	5	2	7	4	3	5
	+5	+8	+1	+3	+6	+4
9.	3	6	4	1	2	3
	+3	+2	+4	+6	+5	+4
10.	8	5	2	6	1	2
	+2	+3	+6	+4	+9	+7
11.	7	2	2	4	3	4
	+3	+2	+4	+5	+2	+2

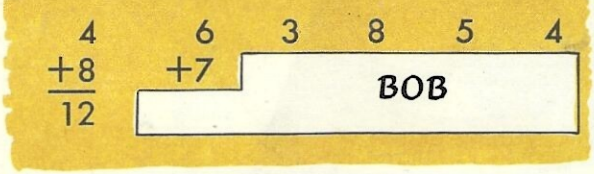
Use page 321 to check your sums.

▶ Use folded paper. Write the answers to questions in rows 1-5.

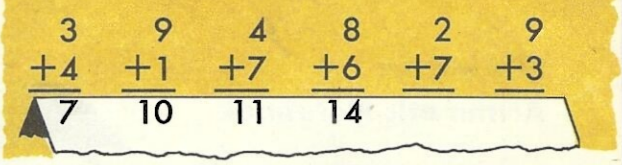
How to Study Addition Facts

1. Write in rows the facts you need to study. Use page 321 to make sure you have the facts right.
2. Cover the sums. Give what you think is the correct answer to a question. Then look and see if you are right. Copy all the facts you missed.
3. Use one or more of the ways to study given on page 7.

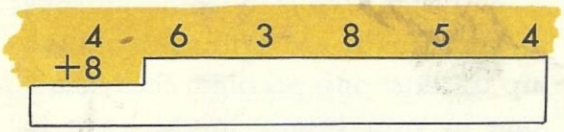
Using Notched Paper



Using Folded Paper



Study Suggestion A: Make a notched piece of paper like Bob's. Begin by cutting a strip long enough to cover a row of the facts you are studying. Have it wide enough to cover the sums and one addend. Cut a notch in the strip so the paper will cover one sum, but allow two addends to show.



4. Look at the picture at the top of this column. Read the addition question that Bob has just answered. How did he find out if he answered it correctly?

5. Read the addition question Bob is now going to answer. When he moves his notched paper, what sum will he see?

6. Use the notched paper you made. Study the facts you copied for exercise 2 on page 6.

7. Use your notched paper. Study the facts on page 321. Keep a record of facts you miss, or cannot say quickly. Use Study Suggestion B to study these facts.

Study Suggestion B: Read carefully the fact you are studying. Say, "9 and 4 equal 13." Close your eyes. Think the fact. Open your eyes. Did you think the fact correctly? If not, study it the same way again.

$$\begin{array}{r} 9 \\ +4 \\ \hline 13 \end{array}$$

Study Suggestion C: Write the number questions you are studying in rows. Use folded paper. Write the sums. Page 321 will help you check your sums.

Study Suggestion D: Count by 2's, 3's, 4's, 5's, and so on.

8. Begin with 21. Count by 2's to 41. Begin with 24. Count by 2's to 40.

9. Begin with 17. Count by 3's to 38.

10. Begin with 6. Count by 4's to 54.

11. Begin with 9. Count by 6's to 63.

12. Begin with any number less than 10. Practice counting by 5's, 6's, 7's, 8's, and 9's.

Making an Arithmetic Notebook

Use about 12 sheets of the paper that you usually use for arithmetic work. Cut some heavy paper to fit as covers. Use paper fasteners or notebook rings to hold your notebook together.

Keep important arithmetic papers in this notebook. You can put many interesting facts and pictures in this notebook, too. Begin with these interesting facts:

1. Find the population of the ten largest cities in the United States. Write the name and population of each of these cities in your notebook.

2. Find out how many people live in your town or city. Write the population in your notebook. Would you say you live in a large city?

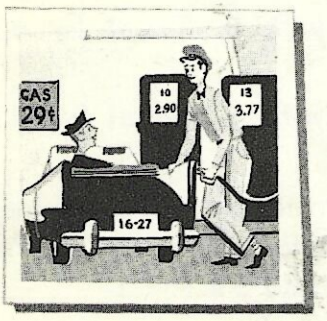
3. Look for pictures in which arithmetic is being used. Paste each on a page in your notebook. Make up at least one arithmetic problem that might be used by a person in the picture.

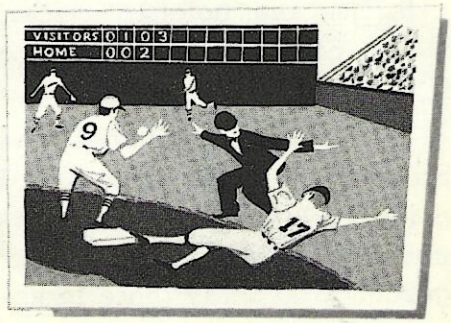
4. List ten ways in which persons in your family use arithmetic. Make up at least one problem that someone in your family might have to solve.

5. List ways in which you would use arithmetic if you worked in each of the following places.

hospital	bank	post office
City Hall	theater	drugstore

6. How do persons in the pictures below use arithmetic?





Practice Test in Addition

Write the sums on folded paper. Your score will give you an idea of how well you remember addition.

Your teacher will tell you when to start and when to stop.

1.	4	5	2	6	9	5
	+8	+7	+9	+5	+7	+8
2.	9	7	5	4	3	9
	+6	+7	+9	+9	+8	+4
3.	4	6	9	3	8	6
	+7	+6	+2	+9	+4	+9
4.	9	5	7	8	9	8
	+8	+6	+5	+3	+9	+7
5.	6	8	7	24	16	
	+8	+9	+8	+7	+8	
6.	19	17	15	28	32	
	+5	+3	+8	+4	+6	
7.	46	17	35	49	84	
	+23	+24	+65	+58	+55	
8.	90	69	54	19	48	
	+76	+53	+68	+85	+67	
9.	30	38	52	32		
	+28	+95	+79	+5		

10. Find out how many correct answers you have. Write this number at the top of your paper.

11. Keep this paper in your arithmetic notebook. Later you can use it to find out if your addition has improved.

12. Make a list of addition questions you could not answer quickly. Study them.

13. If you need more practice, do some of the addition exercises on page 322.

14. Try the following counting exercises. Such exercises will help you add a one-figure number to a two-figure number.

Begin with 9. Count by 4's to 29.

Begin with 12. Count by 5's to 32.

Begin with 15. Count by 7's to 64.

Begin with 14. Count by 8's to 70.

15. Tell what numbers belong where the question marks are.

8, 16, ?, ?, 40, ?, 56

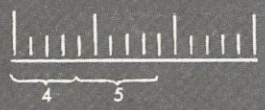
9, 14, 19, ?, ?, ?, 39

7, 16, 25, ?, 43, ?, ?

4, 12, ?, ?, ?, ?, ?

Are you still having difficulty with some of these additions? The exercises on page 10 will help you understand addition better.

BOB



ELLEN

18+7=18+2+5

ANN

●●●●+●●=●●●●●●
4+2 =6

HELEN

37
+45
12
7
82

DON

6+5=6+4+1

CAROL

5
+2 (6,7)
7

FRED

38
+45

3 tens 8 ones
+4 tens 5 ones
7 tens 13 ones
8 tens 3 ones = 83

GEORGE

32+27=32+10+10+7=59

Ways of Adding

1. The children's work above shows different things about addition. Some children showed how additions may be done. Some showed how additions may be explained. Others showed how additions may be checked. Can you tell which of these things each child's work shows?

2. Use Don's method and add 8 and 6.

3. Show the addition of 9 and 4 on a number line.

4. Show by drawing and counting how 7 and 6 are added.

5. If you were to use dots to show the addition of 6 and 5, how many dots would you draw?

6. When Fred added 38 and 45, he had 13 ones in his sum at first. How did he change the 13 ones?

7. Use Fred's method and add 17 and 46.

8. Use George's method. Add 46 and 32.

9. Use Helen's method. Add 68 and 94.

Showing That Sums Are Correct

▶ Copy these rows of problems. Find the sums.

1.	7	3	12	34	20
	+6	+8	+7	+9	+40
2.	16	28	13	14	85
	+18	+35	+48	+40	+29
3.	73	30	76	39	45
	+56	+95	+84	+43	+78

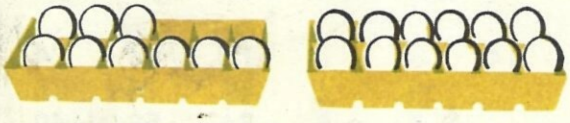
4. Show in two ways that your sums in row 1 are correct.

5. Find sums for rows 2 and 3 again. This time show partial sums as Helen did. Check. Were your answers right the first time you added these rows?

Adding a One-Figure Number to a Two-Figure Number

1. Tommy weighs 68 pounds. His knapsack weighs 7 pounds. When Tommy steps on the scales, where will the pointer stop? Show three ways in which you can find the answer to this problem.

2. There are 12 eggs in one carton and 9 in the other. How many eggs are there in the two cartons? Show three ways to find the answer to this addition question.



3. Which of these ways is best in adding such numbers as 36+7?

a. THINK: 36 + 4 = 40
40 + 3 = 43

b. THINK: 36 = 30 + 6
6 + 7 = 13
30 + 13 = 43

c. THINK: 6 + 7 = 13 Then:
36 + 7 = 43

d. THINK: 36 + 7 = 43

▶ Copy. Add. Use at least two of the ways given in example 3.

4.	27	13	29	16	76
	+4	+8	+5	+8	+7
5.	34	27	26	48	45
	+4	+7	+5	+9	+8

No Pencils, Please!

When you see "No Pencils, Please!" you are to do the work in your mind and say the answer.

6. Jim wrote 19 words in one column and 6 words in another. How many words did he write?

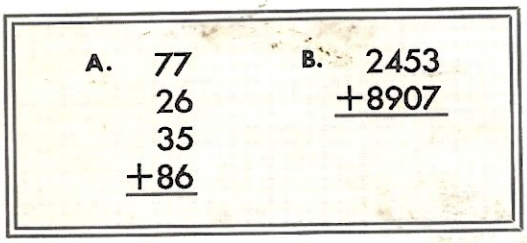
7. Ann did 24 examples in school and 9 examples at home. How many examples did she work?

8. Sharon had 29 pictures. Bob gave her 7 more. How many pictures did she then have?

9. Gary brought 34 shells for the science lesson. Sue brought 8 shells. How many did they bring in all?

Think the Answer

1. The teacher said, "It seems, Tom, that you have trouble when you have to add more than three addends." Do you think the teacher was talking about addition A or addition B?



2. In addition examples, what is the answer called?

3. If you use partial sums in adding such examples as 26+19, do you have to carry?

4. Thirty tens are equal to how many hundreds?

5. To write the number twenty thousand with figures, how many zeros are needed?

6. The number two hundred forty is equal to how many tens?

7. You can think of the number 847 as:

▯ hundreds, ▯ tens, and ▯ ones; or
▯ tens and ▯ ones; or
▯ ones.

8. You can also think of 847 as 80 tens and 47 ones. Explain this.

What addition facts help you to add the ones in these additions? Say the sums.

9.

17	37	57	27	97	47
+6	+6	+6	+6	+6	+6

10.

28	58	98	78	68	38
+9	+9	+9	+9	+9	+9

Use folded paper. Write the sums.

11.

86	59	34	56	87
+3	+7	+8	+36	+45

12.

49	28	16	84	57
+52	+47	+95	+28	+95

13.

8	6	92	31	23
4	0	14	52	57
+6	+3	+23	+26	+35

14.

8	7	12	53	24
9	4	45	15	36
7	6	74	58	49
+6	+8	+26	+49	+63

15.

6	58	27	4	7
21	46	32	9	26
54	3	4	36	29
+7	+62	+35	+8	+5

In addition, the amounts you put together, or add, are called the addends. The answer is called the sum.

Adding Larger Amounts

1. In which of Jerry's six additions was there no carrying?

JERRY

A.	B.	C.
236	436	5267
+482	+523	+2132
718	959	7399

D.	E.	F.
739	376	932
+248	+298	+846
987	674	1778

2. In which addition did he carry from ones place to tens place only?

3. In which did he carry from tens place to hundreds place only?

4. In which addition did he carry from ones place to tens place and from tens place to hundreds place?

5. In two of Jerry's additions he had to write a figure in thousands place. Why?

6. At a baseball game there were 1352 children from Irving School and 1132 from Adams School. How many children was this?

ANN

1 thousand 3 hundreds 5 tens 2 ones
+1 thousand 1 hundred 3 tens 2 ones
2 thousands 4 hundreds 8 tens 4 ones
=2484 the sum

How did Ann think as she found the answer to problem 6?

7. At a city-wide track meet 9642 children and 2769 adults saw the events. How many were there in all? Explain Mary's addition.

MARY

ten thousands
thousands
hundreds
tens
ones

① ① ① ①
9642
+2769
12411

8. In a clean-up parade there were 897 boys, 745 girls, and 689 adults. How many people were in the parade?

TOM

② ② ②
897
745
+689
2331

Explain how Tom found the figures he wrote in the circles.

▶ Use folded paper. Add.

9.				
	386	597	539	826
	+942	+628	+794	+576

10.				
	1596	6483	2195	3896
	+3843	+2439	+5328	+1965

Do You Know Your Money?

1. What amount of money is shown at the top of the page? In writing your answer, you may use either the cents sign or the dollar sign and cents point.

2. Here is how some of the children answered problem 1. Which answers are correct?

Fred:	$1.02	Nan:	97¢
Bill:	$ .92	Carl:	92¢
Alice:	$ .97	June:	.97¢

3. Jack said the dollar bill and the two coins shown below are equal to one hundred sixty cents. Was he right?

■ **Any amount of money may be written with the dollar sign and cents point**

4. Use the dollar sign and cents point. Write three dollars and forty cents; one dollar and five cents; thirty-seven dollars and five cents; nine cents.

The correct name for the cents point is the **decimal point.**

■ **A decimal point is used with the dollar sign to show cents, or hundredth parts of a dollar.**

5. One cent ($.01) is one hundredth of a dollar. Fifty cents ($.50) is how many hundredths of a dollar? Fifteen cents is how many hundredths of a dollar?

6. Read these amounts of money. The first is read, "One dollar and forty-two cents."

$1.42	$112.53	$.09
$1435.78	$15.05	$400.04
$.59	$2000.20	$8.00

7. Which one of the following amounts of money is nearly three dollars? Nearly seven dollars? Nearly eleven dollars? Nearly two dollars?

$10.98 $2.98 $1.75 $6.75

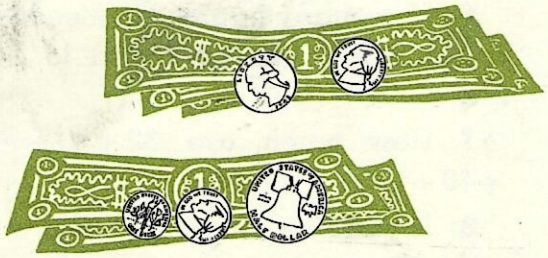
Counting Coins and Adding Money Numbers

1. Nan bought a pencil for $1.10. She gave the clerk a half dollar, two quarters, and two nickels. Was that right?

2. Don bought a knife for 85¢. Was four dimes and a fifty-cent piece enough money to pay for it?

3. Bob bought 60¢ worth of candy. He gave the clerk a quarter, four dimes, and a nickel. Did he pay the right amount?

4. Mary bought $3.30 worth of meat, and $2.65 worth of vegetables. How much did she spend in all?



■ **In adding amounts of money, keep the decimal points directly under each other.**

Copy in columns. Add.

5. $4.25, $1.06, $3.26

6. $52.15, $7.11, $16.08

■ **Before you can add cents to dollars and cents, all amounts of money must be written with the dollar sign and decimal point.**

Write these numbers ready for adding. Add.

7. $0.46, $3.76, $2.95

8. $16.28, $3.49, $5.34

9. $4.10, $.25, 95¢, 4¢

10. $1.02, 32¢, 85¢, $5.50

▶ Use folded paper. Add.

11.	$.40 +.65	$8.95 +3.27	$542.34 +134.75
12.	$.85 +.97	$24.34 +7.05	$623.00 +52.85
13.	$6.82 .25 +1.12	$9.85 5.16 +.05	$35.44 1.65 +3.50

14. Ann paid $5.95 for a tennis racket, 98¢ for balls, and $2.95 for shoes. What did she spend in all?

15. Mother paid $11.89 for groceries, $2.15 for meat, and $12.50 for coal. In all, what did she pay?

16. Father paid $65.12 for a suit and $8.00 for a hat. If he wrote a check to pay for both, for what amount must the check be written?

Using Addition to Check Problems

1. Tom, Bill, and Ralph sold their scrap iron to a junk dealer. They told him each wanted to be paid his share. The man said, "All right, boys. The whole load is $1.47. Here is 49¢ for you, 49¢ for you, and 49¢ for you." Did the man give them $1.47?

2. Nan and May found 48 walnuts. They divided them so each had an equal part. Then they tried to check by adding. Here is the figuring they did. How many walnuts should each have had?

$$\begin{array}{r} 22 \\ +22 \\ \hline 44 \end{array} \qquad \begin{array}{r} 25 \\ +25 \\ \hline 50 \end{array} \qquad \begin{array}{r} 24 \\ +24 \\ \hline 48 \end{array}$$

3. A man bought $3.86 worth of gasoline, 41 cents worth of oil, and a 6¢ drink at a filling station. The station man said, "That will be $4.27." Was he correct?

No Pencils, Please!

4. How many are 8 tens and 9 tens?

5. What number has 7 in ten thousands place, a zero in the thousands and hundreds places, 4 in tens place, and 2 in ones place?

6. How many figures are needed to write the number equal to 24 tens?

7. How much are $32+10+10+10+6$?

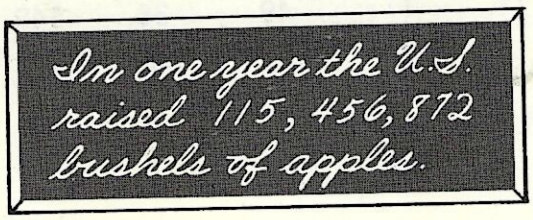
8. In adding this example, how many tens are carried?

$$\begin{array}{r} 26 \\ 18 \\ +27 \\ \hline \end{array}$$

9. What would be the second partial sum in example 4?

10. How many marks do you need to show 2001 on a number frame?

The Comma in Long Numbers



1. Ann has written a sentence from her geography on the blackboard. How do the commas help you to read the long number?

It would be very hard to read the number if it were written without commas, as, 115456872. Numbers are much easier to read if a comma is written after millions, and another comma after thousands.

millions	thousands	ones
115 ,	456 ,	872

To read Ann's long number, say, "115 million 456 thousand 872."

2. If you were going to place a comma in the number 36825, you could think: 36 thousand, 825. Where would you place the comma?

3. Where does the comma go in:
352867 19053 25780

4. If you were going to place the commas in the number 534892705, you could think: 534 million, 892 thousand, 705. Where would you place the commas?

5. Where do the commas go in:
1425834 45982361 123000000

This is the way to think when you place commas in a number.

Begin with the first figure at the right. Think, "Ones, tens, hundreds, thousands." Place a comma between thousands and hundreds.

Then begin with thousands. Think, "Thousands, ten thousands, hundred thousands, millions." Place a comma between millions and hundred thousands.

6. Are the commas placed correctly in these numbers?
15,767,240 ? 62,583,67 ?

7. Where do the commas go in these numbers? Read the numbers.
920300030 581203000 92374
200000020 498169 7856

8. The teacher asked Tom to write seven thousand two in figures. Tom wrote 7002. How many tens are there in tens place? How did Tom show this? Why did he write zero in hundreds place?

9. Write one million one hundred. Put the commas in the proper places.

10. Tell what the 8 stands for in each of these numbers.
123,809 8,236,423 800,593

Taking Stock — Test 1

Write the sums on folded paper. Your teacher will tell you when to start and when to stop.

1.	7 +5	9 +4	2 +9	3 +8
2.	5 +7	3 +8	5 +6	4 +8
3.	4 +7	6 +5	4 +9	9 +8
4.	9 +7	6 +6	8 +4	5 +8
5.	9 +6	3 +9	6 +8	8 +9
6.	9 +2	8 +7	9 +9	7 +7
7.	5 +9	6 +9	7 +8	7 +6
8.	32 +5	19 +9	16 +8	24 +7
9.	8 +8	7 +9	19 +5	32 +6
10.	28 +4	15 +8	17 +3	35 +65
11.	17 +24	49 +58	38 +95	49 +58
12.	46 +23	30 +28	90 +76	84 +55

Check your answers. Write the number of correct answers and your time on your paper. Compare your score with the score you made on the test on page 9. You can tell whether you have improved since taking that test.

If you need practice, use some of the study suggestions on pages 10 and 11.

Put this test in your notebook. This is your first "Taking Stock" test.

Below are some words you will use very often. Write them in your notebook. Study them carefully.

million
decimal
arithmetic
value
comma
addend
hundred
thousand

Estimating Amounts

Sometimes we do not use the exact amount. Instead we think of the amount in **round numbers.** That is, you give the amount to the nearest ten, hundred, or thousand, and the like. A very large number may be rounded to the nearest million.

The rounded number is not exact, but it gives an idea, or **estimate,** of what the exact amount would be.

1. If there were 48 children in your class, you could estimate the number to the nearest ten. You could say there are about ☐ children in your class.

2. If an event happened in the year 1905, you could round the number to the nearest hundred. You could say the time was about ☐.

3. There were 38 children in one school bus and 39 in another. Ann said there were about 80 children in both buses. How did she think to estimate this?

4. Tom had 29 stamps on one page and 32 on another page. He said, "I have about 60 stamps on these two pages." How did he estimate this?

5. Uncle Jim has 415 chicks in one brooder and 395 chicks in another. He said he has about 800 chicks. Did he round to the nearest tens or to the nearest hundreds?

6. Jane wondered how much money she would need to buy 3 boxes of stationery at 29¢ a box. How could she estimate the cost quickly? What would the exact cost be?

▶ Use folded paper. Write the sums as quickly as you can. Remember, it is important to get right answers as well as to work quickly.

7.

64	31	26	35	42
+7	+8	+5	+7	+5

8.

73	71	58	39	65
+8	+6	+9	+7	+6

9.

26	89	90	67	38
+43	+17	+84	+19	+64

10.

70	16	49	53	82
+85	+35	+56	+78	+49

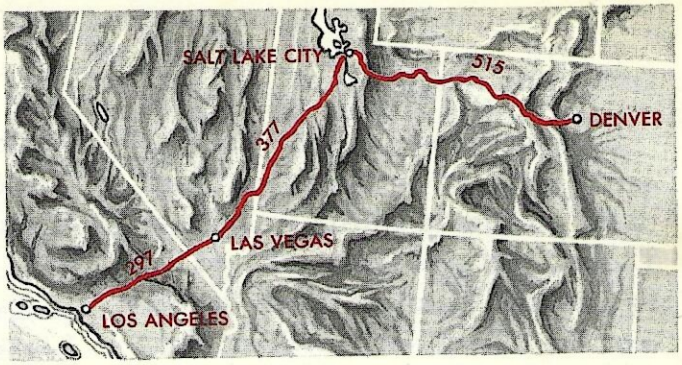
11.

14	36	$ .50	$.16
22	40	1.26	.05
19	28	.73	.28
+77	+34	+4.05	+.35

12.

$9.50	$5.25	$12.15
2.01	4.21	3.25
3.55	.87	.56
+6.18	+.16	+4.30

Thinking and Adding Round Numbers



The Jones family was driving from Los Angeles to Denver. Mr. Jones looked at the map, added 5, 4, and 3, and said, "In round numbers, it's about 12 hundred miles from Denver to Los Angeles."

1. Did he round to the nearest ten or the nearest thousand?

2. To what number did Mr. Jones round the 515 miles between Denver and Salt Lake City?

3. In his report Jack gave the 1950 population of Minneapolis as 500,000 people instead of the census figure of 521,718. Did he round to the nearest thousand, ten thousand, or hundred thousand?

4. The figures in the chart show the number of cars that crossed a traffic counter each day in a week. Round each to the nearest hundred.

S	1860
M	2781
T	3952
W	1120
T	2849
F	1307
S	2109

5. If you use round numbers and then add, you can get a good estimate of the sum. Round to the nearest hundred and then add.

2113	1951	7314	625
+4216	+3160	+1128	+595

▶ Use folded paper. Write the sums.

6.

63	84	95	79	57
+25	+63	+84	+87	+98

7.

92	40	790	420
76	30	235	87
+8	+20	+596	+619

8.

28	31		
43	42	509	378
67	56	316	215
84	73	647	582
+20	+91	+938	+482

9. For each addition in rows 6-8 read the exact answer. Then read your answer rounded to the nearest hundred.

Using Addition

1. Bill tied together 3 pieces of kite string. The first was 64 feet long, the second was 27 feet long, and the last was 50 feet long. How much string did he use?

2. At the store, Jane spent $7.85 for a tennis racket, $2.25 for 3 tennis balls, and forty cents for a roll of tape. How much did she spend?

3. The Smith family drove 78 miles Friday evening, 186 miles Saturday, and 297 miles Sunday. How many miles did they drive in all?

4. Mr. Smith paid $7.70 for a tourist cabin, $5.58 for gasoline, and $16.25 for meals. How much did he pay in all?

5. Mrs. Smith took pictures on the trip. She paid 75¢ for film, 30¢ to have the film developed, and $1.25 to have prints made. How much did the pictures cost?

(How must you write 75¢ and 30¢?)

6. Dorothy paid 25¢ for post cards, $1.79 for a lamp, and 98¢ for a book. How much did she spend?

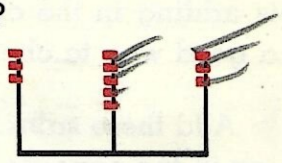
7. Jack traded stamps with a boy at the tourist camp. Jack now has 314 United States stamps, 77 British stamps, 64 French stamps, and 98 Dutch stamps. How many stamps does he have in all?

No Pencils, Please!

8. Seventy-six rounded to the nearest 10 is how much?

9. How does use of round numbers make adding easier?

10. What number is represented on this abacus?



11. How many commas are needed to write two million fifty-seven thousand correctly with figures?

12. How could you use addition to find out whether or not 65 is one third of 145?

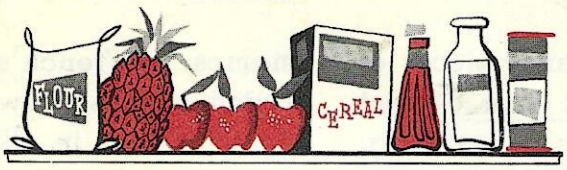
13. Add 8 to each of these numbers: 42, 18, 13, 24, and 17.

14. Add these numbers by using steps of 10: 32+26; 18+42; 39+25; 72+45. (Here is the way 36 and 45 is done: 36+10+10+10+10+5.)

15. Say the sums. Check your addition by saying steps of 10 and then adding the ones.

17	38	93	65	86	39
+24	+45	+15	+28	+22	+54

Another Way to Check Addition



$	5.60
$	2.99
$	1.49
$	5.85
$	15.93

1. Mary asked Bill to add the amounts on the adding machine slip pictured above. He got $15.83 for his sum. Mary told him his addition was wrong. She said, "After you find your sum, check your addition by adding up." Why is adding in the opposite direction a good way to check addition?

▶ Add these sales. Check by adding in the opposite direction.

2.	$5.12	$ .65	$1.25
	.85	1.65	4.12
	.58	.79	2.35
	+.09	+3.21	+.95
3.	$ .10	$4.15	$ .97
	.89	.19	.75
	.09	.30	.29
	+3.25	+2.79	+.57
4.	$11.25	$10.59	$13.14
	3.30	.89	11.50
	.39	1.03	.15
	+13.40	+.69	+1.29
5.	$ 6.75	$15.14	$ .15
	.04	.59	.85
	3.75	16.58	10.35
	12.15	1.45	7.29
	4.16	13.49	15.65
	+21.30	+9.85	+24.75

▶ Use folded paper. Add. Check by adding up.

6.	35	56	48	35
	53	17	94	32
	16	65	93	26
	+65	+84	+37	+95
7.	29	33	61	80
	53	49	68	27
	48	37	24	85
	+56	+82	+53	+37
8.	12	49	73	69
	55	31	24	53
	39	84	53	97
	47	52	89	43
	+41	+36	+63	+82

9. Copy the additions in row 6. Add. Use the mark-out check to show that your sums are right.

10. Copy the additions in row 8. By using partial sums, show that your sums are right.

11. Save adding machine slips for your notebook. Read the numbers to your class or friends. Ask them to add the numbers.

12. Did the pupils get the same sums as the machine did? Which way did they use to check their sums?

Problems Using Addition

1. Jane read 199 pages of her storybook last week. This week she read 105 pages. In both weeks together she read exactly how many pages? If you estimate, you can say she read about how many pages?

2. Bob spent $.98 for a pair of gloves and $1.98 for a scarf. Estimate to the nearest dollar the cost of the gloves. Estimate to the nearest dollar the cost of the scarf. Estimate the amount he spent, using your round numbers.

3. Find out exactly how much Bob spent for the gloves and scarf.

4. Mr. Smith drove 385 miles one day, and 205 miles the next. Round the distances to the nearest hundreds. Estimate how far he drove in the two days.

5. Find out exactly how far Mr. Smith drove in the two days.

To answer, write **Yes** or **No**.

6. A man who has $450,329.50 has about one million dollars.

7. I would rather be given $146,479.34 than $250,000.

8. The number 75,359 has been rounded to the nearest thousand.

9. Will there be a zero in five thousand two hundred sixty-three if the number is written in figures?

10. Ann read that the sun is 1,300,000 times as large as the earth. Is this figure given exactly?

▶ Use folded paper. Write the sums. Check by adding up.

11.

276	$8.23	896	$ .89
+965	+1.97	+456	+4.72

12.

15		5213	
76	384	482	$1.75
48	328	31	.95
+39	+154	+2164	+.04

13.

25¢	$3.89	138	
8¢	2.15	80	$15.46
14¢	1.36	24	4.12
+52¢	+2.57	+316	+21.50

14.

$4.37	95	450	
1.20	246	8	
.15	32	238	4135
.05	127	44	2148
+3.24	+9	+316	+1632

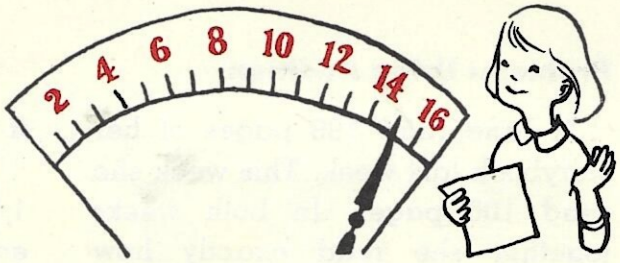
15.

38	51	9	$4.16
46	69	12	.93
27	38	7	.09
93	47	83	24.54
+42	+82	+96	+5.24

16.

4237		
25	$45.23	$125.72
276	12.35	375.20
2138	9.76	153.89
+52	+ 10.50	+214.40

How Well Have You Learned?



Do these exercises. They will help you to see how well you have learned the important things taught in this unit.

1. When you show numbers like 803 on an abacus, how is the zero shown?

2. Draw a chart for number reading. Write 25,306,500 on your chart.

3. The number thirty-four hundred contains how many thousands?

4. In this example, what numbers are addends?

$$\begin{array}{r} 26 \\ +18 \\ \hline 44 \end{array}$$

5. If the mark-out check were used in this addition, what numbers would be marked out?

$$\begin{array}{r} 45 \\ 74 \\ +56 \\ \hline 175 \end{array}$$

6. How many dots would you draw to show how 8 and 6 are added?

7. What are two ways to show that 28 and 19 equal 47?

8. What is another name for the cents point in $2.59?

9. Use two ways. Find how much the coins in the following picture are worth if added together.

10. Round 187 to the nearest 10.

11. Add 26 and 42, using steps of 10.

Write in columns and add.

12. $45.13, $4.42, $.89

13. 24¢, 16¢, 36¢, 29¢

14. 3463 and 475

15. 6, 419, 36, 637, 42

16. 597, 317, 382, 536, 374

How far to the right did your correct answers turn the pointer on the dial?

If the pointer went far to the right, you know the work of this unit very well. If it did not go very far, you need to do more work.

Help Yourself to Improve

If the pointer on the dial went far to the right, you know the work of this unit very well.

If the pointer on your dial did not go very far to the right, you need some help. Do the work on this page. The red figures show pages where the work was taught.

1. Draw an abacus. Show the number 5016 on it. (1)

2. Write with figures the number two hundred million. (2)

3. Write with figures the number eighteen million, forty-six thousand, two hundred eight. Place commas in the proper places. (17)

4. Draw a place-value frame. Show the number 1006 on it. (3)

5. Add 48 and 73 by using partial sums. (4)

6. Add the numbers 208, 316, and 76. Check by using the mark-out check. (5)

7. Show the addition of 16 and 9 on the number line. (5)

8. Give three good ways to study such addition facts as $6+8=14$. (7)

9. Begin with 11. Count by 4's to 43. (7)

10. Use words for 10's and 1's. Show how ones are changed to tens and ones in adding 37 and 19. (10)

11. Show two ways of adding such numbers as 28 and 8. (11)

12. Use figures. Write two dollars and five cents in two different ways. (14)

13. Round these numbers to the nearest thousand: 1826, 5125, 916, 10,587. (20)

14. Copy. Place commas so that the numbers can be read more easily. (17)

52130098 158943 234890392

Write sums quickly on folded paper. (6, 7)

15.

8	9	4	7	6	0	5
+7	+9	+8	+4	+6	+0	+2

16.

3	8	2	9	7	5	8
+6	+1	+0	+7	+5	+5	+3

17.

4	6	5	9	7	8	5
+9	+5	+8	+5	+8	+8	+9

18.

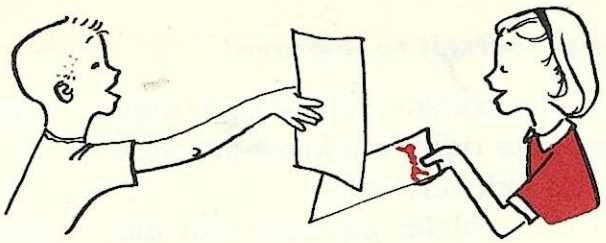
6	8	4	9	2	7	6
+9	+6	+7	+8	+9	+6	+4

19.

5	7	4	8	9	5	4
+4	+3	+6	+5	+4	+7	+4

20. Write with figures: six hundred; six million; six thousand; sixty thousand; six hundred thousand. (1)

Show That You Know



- Work carefully.
- Write figures well.
- Arrange papers neatly.
- Keep columns of figures straight.
- Number each example properly.

1. Last week Mr. Miller's sales were $1463.76. This week his sales were $1765.15. What were his total sales for the two weeks?

2. The speedometer on Mr. West's car showed 35,972 miles. He then took a trip of 2575 miles. What did the speedometer show at the end of the trip?

3. Bill bought a quart of milk for 24¢, a pan of rolls for 29¢, a pound of butter for 79¢, and a half pound of bacon for 49¢. How much did he spend?

4. Ellen's mother bought Ellen a coat costing $39.98, a pair of shoes costing $9.95, and a pair of gloves for $.89. How much was spent for these things?

5. A dealer allowed Mr. Brown $875 for his old car. Mr. Brown traded his old car and paid $1275 more to get a new car. What did he pay for his new car?

6. A school library had 2389 books. Today the library received 46 new books. How many books does the library now have?

7. Mount Everest, the highest mountain in the world, is about 29,140 feet high. How high would you say this mountain is, if you round the height given here to the nearest thousand?

8. The population of the United States in 1790 was 3929214. Copy and place commas in the proper places in this long number. Then round to the nearest million.

9. A filling station owner sold 560 gallons of gasoline on Saturday. The next day he sold 135 gallons. The third day he sold 389 gallons. How many gallons did he sell in the three days?

10. Father drove 95 miles Monday, 8 miles Tuesday, and 358 miles Wednesday. How many miles did he drive in the three days?

Answering Subtraction Questions

1. Ruth and Gary are giving out lunch tickets. Gary began with 123 tickets. He has given 6 tickets to children. Ruth asked, "Gary, how many tickets have you left?"

Write the subtraction question that Gary had to answer.

2. Gary found his answer by thinking, "6 from 123 is 117." Ruth said, "Are you sure that 117 is the right answer?"

Gary said, "It will take too long to count 117 tickets. You can find out this way. When I sold 1 ticket, I had 122 tickets left." Then he said, "121, 120, 119, 118, 117." Explain how Gary proved his answer.

3. Gary could have found the answer to his subtraction question by counting backwards by 2's. Look at the number line. Read the numbers he would have thought while counting.

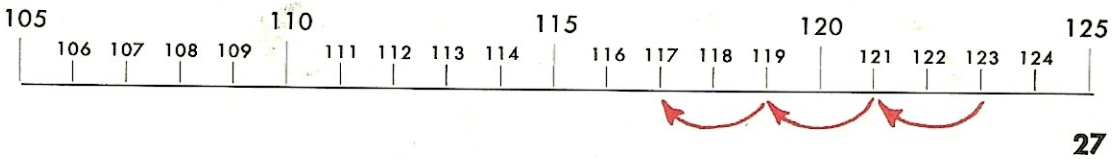
4. Show on a number line that Gary would have found the same answer counting backwards by 3's.

5. Which of the following shows what Gary thought when he counted backwards by 2's? By 3's? By 1's?

A.
$$\begin{array}{r} 123 \\ -3 \\ \hline 120 \\ -3 \\ \hline 117 \end{array}$$

B.
$$\begin{array}{r} 123 \\ -1 \\ \hline 122 \\ -1 \\ \hline 121 \\ -1 \\ \hline 120 \\ -1 \\ \hline 119 \\ -1 \\ \hline 118 \\ -1 \\ \hline 117 \end{array}$$

C.
$$\begin{array}{r} 123 \\ -2 \\ \hline 121 \\ -2 \\ \hline 119 \\ -2 \\ \hline 117 \end{array}$$



Find the answers to the subtraction questions in row 6 by counting backwards by 2's.

6.
$$\begin{array}{rrrr} 28 & 19 & 45 & 20 \\ -\,6 & -\,8 & -\,4 & -\,6 \\ \hline \end{array}$$

7. Check your answers for subtractions in row 6 by subtracting.

That is,

THINK: 6 from 28 = 22.

WRITE:
$$\begin{array}{r} 28 \\ -\,6 \\ \hline 22 \end{array}$$

8. Which is the shorter way, counting backwards, or just thinking the subtraction?

Subtracting by Counting Backwards

Counting backwards is good subtraction practice. Here are some exercises that will show whether you can count backwards.

1. Count backwards by 2's from 44. Write the first number you say in the 20's.

2. Count backwards by 3's from 52. Write the first number you say in the 30's.

3. Count backwards by 6's from 81. Write the first number you say in the 30's.

4. Count backwards from 93 by 8's. Write the first number you say in the 40's.

5. Count backwards by 7's from 75. Write the first "teens" number that you say.

6. Check your answers for exercises 1 through 5 as your teacher reads the right answers.

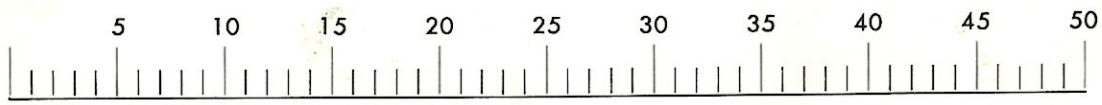
If the right answers were not given to you, how could you use addition to prove your answers?

7. Show on a number line that when you count backwards from 43 by 4's the last number you say in the 20's is 23.

8. On a number line show that counting backwards by 3's from 31 to 19 is the same as subtracting four 3's from 31.

9. Jim had 24 paper airplanes. He gave 2 to Bob, 2 to Dick, and 2 to Don. Count backwards by 2's to find how many Jim had left.

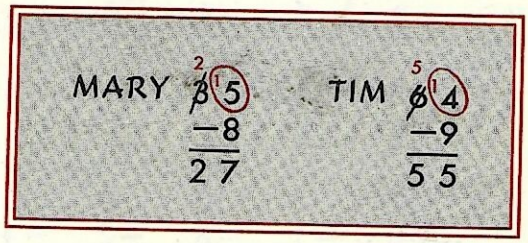
10. Ann had 44 envelopes. She used 9 of them. How many did she have left? Count backwards by 3's to check your answer.



Basic Subtraction Facts

1. Mary had 35 postage stamps. She used 8 of them. How many stamps did she have left?

Look at Mary's subtraction. Explain why you must know the basic number fact $15-8=7$.



$$\begin{array}{r} 2\,\not{3}\,{}^{1}\!5 \\ -\,8 \\ \hline 2\,7 \end{array} \qquad \begin{array}{r} 5\,\not{6}\,{}^{1}\!4 \\ -\,9 \\ \hline 5\,5 \end{array}$$

2. Count backwards by 1's. Is 27 the right answer to Mary's problem?

3. Which subtraction problem above used the basic number fact $14-9=5$? Explain.

4. Show how counting backwards could help you if you did not know: $17-8=9$ $\quad 14-5=9$ $\quad 15-7=8$

If you had trouble counting backwards, it may be you do not know the basic subtraction facts well.

■ **The basic subtraction facts are those facts in which a one-figure number is subtracted from 18, or a number less than 18, and the difference is a one-figure number.**

5. Tell why basic subtraction facts are called "basic."

What basic subtraction fact was used in each example when the ones were subtracted?

6.
$$\begin{array}{r} 7\,\not{8}\,{}^{1}\!4 \\ -\,5 \\ \hline 7\,9 \end{array} \qquad \begin{array}{r} 3\,\not{4}\,{}^{1}\!7 \\ -\,9 \\ \hline 3\,8 \end{array} \qquad \begin{array}{r} 5\,\not{6}\,{}^{1}\!2 \\ -\,6 \\ \hline 5\,6 \end{array} \qquad \begin{array}{r} 8\,\not{9}\,{}^{1}\!1 \\ -\,8 \\ \hline 8\,3 \end{array} \qquad \begin{array}{r} 2\,\not{3}\,{}^{1}\!8 \\ -\,9 \\ \hline 2\,9 \end{array}$$

7.
$$\begin{array}{r} 75 \\ -\,6 \\ \hline 69 \end{array} \qquad \begin{array}{r} 37 \\ -\,8 \\ \hline 29 \end{array} \qquad \begin{array}{r} 73 \\ -\,5 \\ \hline 68 \end{array} \qquad \begin{array}{r} 86 \\ -\,8 \\ \hline 78 \end{array} \qquad \begin{array}{r} 52 \\ -\,4 \\ \hline 48 \end{array}$$

▶ Which facts do you need to study? Use folded paper.

8.
$$\begin{array}{r} 14 \\ -\,5 \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ -\,9 \\ \hline \end{array} \qquad \begin{array}{r} 16 \\ -\,8 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -\,2 \\ \hline \end{array} \qquad \begin{array}{r} 9 \\ -\,5 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 15 \\ -\,7 \\ \hline \end{array} \qquad \begin{array}{r} 11 \\ -\,2 \\ \hline \end{array} \qquad \begin{array}{r} 7 \\ -\,3 \\ \hline \end{array} \qquad \begin{array}{r} 11 \\ -\,6 \\ \hline \end{array} \qquad \begin{array}{r} 14 \\ -\,7 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 17 \\ -\,9 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ -\,3 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ -\,2 \\ \hline \end{array} \qquad \begin{array}{r} 9 \\ -\,7 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ -\,6 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 16 \\ -\,7 \\ \hline \end{array} \qquad \begin{array}{r} 7 \\ -\,5 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -\,1 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ -\,3 \\ \hline \end{array} \qquad \begin{array}{r} 18 \\ -\,9 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 5 \\ -\,2 \\ \hline \end{array} \qquad \begin{array}{r} 11 \\ -\,7 \\ \hline \end{array} \qquad \begin{array}{r} 9 \\ -\,1 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ -\,2 \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ -\,4 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 14 \\ -\,8 \\ \hline \end{array} \qquad \begin{array}{r} 3 \\ -\,1 \\ \hline \end{array} \qquad \begin{array}{r} 6 \\ -\,3 \\ \hline \end{array} \qquad \begin{array}{r} 13 \\ -\,9 \\ \hline \end{array} \qquad \begin{array}{r} 5 \\ -\,4 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 6 \\ -\,2 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ -\,5 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -\,3 \\ \hline \end{array} \qquad \begin{array}{r} 7 \\ -\,6 \\ \hline \end{array} \qquad \begin{array}{r} 15 \\ -\,9 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 9 \\ -\,6 \\ \hline \end{array} \qquad \begin{array}{r} 11 \\ -\,8 \\ \hline \end{array} \qquad \begin{array}{r} 2 \\ -\,1 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ -\,9 \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ -\,6 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 13 \\ -\,8 \\ \hline \end{array} \qquad \begin{array}{r} 6 \\ -\,5 \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ -\,7 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -\,4 \\ \hline \end{array} \qquad \begin{array}{r} 13 \\ -\,6 \\ \hline \end{array}$$

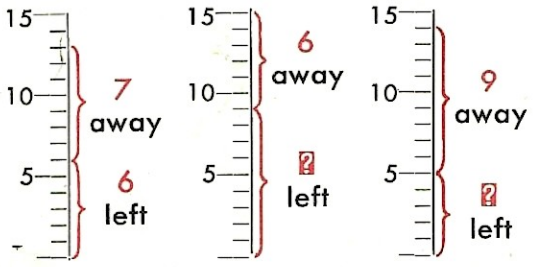
Ways to Study the Subtraction Facts

1. Write correctly in rows the subtraction facts that you need to study. With each fact use these five study steps.

   a. Read the fact.
   b. Close your eyes. Try to see the fact.
   c. Think the fact with your eyes closed.
   d. Open your eyes. See if the fact is exactly as you thought it with your eyes closed.
   e. If the fact is not the same, read it again carefully. Go through the steps again.

2. Cover the correct answers. Write your answer for each question on a folded paper. Move the paper. Check your answers.

3. Showing facts you do not know well on a number line may help you. The first drawing below shows $13-7=6$. What do the other number lines show?



4. Show this subtraction fact on a number line: $18-9=9$.

5. Make number line drawings for facts that you find difficult.

Write answers on folded paper. Use page 323 to check your work.

1.	14	12	16	8	9
	−9	−3	−8	−6	−4
2.	15	11	7	11	14
	−8	−9	−4	−5	−7
3.	17	4	10	9	10
	−8	−1	−8	−2	−4
4.	16	7	8	10	18
	−9	−2	−7	−7	−9
5.	5	11	9	4	12
	−3	−4	−8	−2	−8
6.	14	3	6	13	5
	−6	−2	−3	−4	−1
7.	6	10	8	7	15
	−4	−5	−5	−1	−6
8.	9	11	2	10	12
	−3	−3	−1	−1	−6
9.	13	6	12	8	13
	−5	−1	−5	−4	−7

10. Use folded paper. Write the answers to the subtraction questions on page 324. Use page 323 to check your answers.

BILL			FRED	MARY
56 =	5 tens 6 ones =	4 tens 16 ones	4 ⁵⁄₆	56
−29 =	−2 tens 9 ones =	−2 tens 9 ones	−29	−29
??		2 tens 7 ones = 27	27	27

Recalling How to Borrow in Subtraction

1. Joan was not sure that she remembered how to subtract 29 from 56. Bill wrote the subtraction on the blackboard.

How did Bill get 5 tens 6 ones? How did he get 2 tens 9 ones?

2. When Bill saw that he could not take 9 ones from 6 ones, what did he do?

3. Fred subtracted 29 from 56 a different way. How did he show 4 tens and 16 ones?

4. Mary used the shortest way to subtract 29 from 56. What did she think when she saw she could not take 9 ones from 6 ones? What did she think to finish the subtraction problem?

Use Bill's long way. Find the answers.

5.	64	83	67	70	62
	−19	−45	−28	−43	−36

Use Fred's way of showing a ten changed to ones. Find the answers.

6.	72	53	41	82	93
	−18	−27	−25	−49	−58

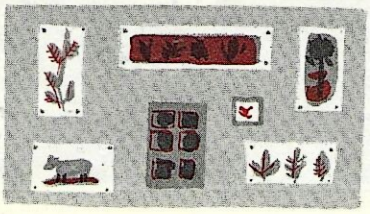
Why is Mary's way the best way to subtract? Try to learn to subtract without writing everything you think.

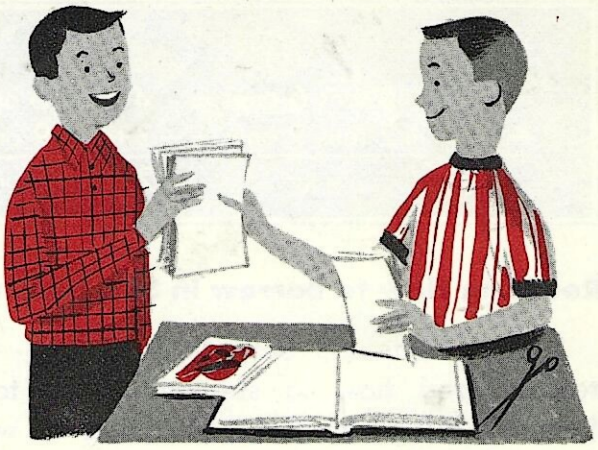
Work each of these examples by the three ways shown at the top of the page.

7.	71	53	40	67	74
	−39	−26	−15	−28	−48

▶ Use one of the shorter ways. Copy. Find the answers.

8.	91	94	46	87	73
	−45	−38	−27	−39	−24
9.	82	71	87	93	62
	−47	−37	−68	−89	−33
10.	63	97	54	72	56
	−44	−59	−27	−56	−28
11.	92	40	74	81	63
	−45	−32	−38	−47	−36
12.	74	87	96	60	98
	−57	−38	−29	−45	−69
13.	58	70	61	45	83
	−39	−43	−26	−27	−36





Proving Answers in Subtraction

1. Bob had 15 science pictures. He wanted to paste 8 of them in his notebook and give the rest to Tom. He gave Tom 9 of the pictures. Why did Bob not have enough pictures left for himself?

It is wise to check your subtraction and be sure that you have subtracted correctly. If Bob had tried to prove his subtraction, he would have found his mistake.

2. Show how he could have proved it by drawing dots.

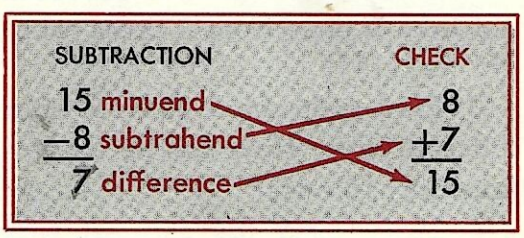
3. Show how he could have proved it with a number line.

4. Solve Bob's problem by counting backwards by 1's. By 2's. By 4's.

5. Bob could have used addition to prove his subtraction. What numbers would he have added?

Learn the terms, or the names, of the numbers used in subtraction. Then you can make a rule for checking subtraction by adding.

You can see that $8+7=15$.



■ **To prove, or check, subtraction, add the difference to the subtrahend. If the sum is the same as the minuend, the subtraction is correct.**

Show in two ways that your answers for these problems are correct.

6. Jim had 27 airplane pictures. He decided to keep the 18 that he liked best. How many could he give away?

7. Susan has 31 books. She read 12 of them. How many more does she have to read?

Copy. Find answers. Prove by adding.

8.	53	71	40	53	64
	−9	−5	−7	−8	−9
9.	74	57	84	92	52
	−28	−49	−55	−74	−23
10.	61	45	36	52	65
	−39	−28	−19	−26	−17
11.	87	54	46	68	96
	−49	−25	−17	−19	−78
12.	47	83	96	81	56
	−28	−35	−57	−54	−39

Prove your answer to each problem in at least one way.

13. There are 37 children in Jack's room at school. If 9 children are absent, how many came to school?

14. Mary had a ribbon that was 35 inches long. She cut off a piece 18 inches long. How long was the piece that Mary had left?

15. Jerry is 61 inches tall. Jane is 58 inches tall. Jerry is how many inches taller than Jane?

16. Marie had 35 arithmetic examples to work. She got 19 of the examples on one side of her paper. How many should she have on the other side in order to finish the examples?

17. Jack's father worked 53 hours last week. This week he worked 35 hours. He worked how many fewer hours this week?

18. Bob made a score of 75 points in a game. Bill made a score of 84 points. Bill scored how many more points than Bob?

19. Ann wants to review 95 spelling words. After she has reviewed 27 words, how many words are left?

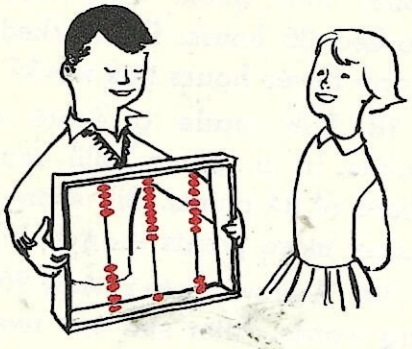
20. Mary has 88 beads to string into a necklace. After she has strung 49 beads, how many beads should she have left to string?

21. Allen planted 56 onion sets. His father told him to plant 80 sets in all. How many more must Allen plant?

22. Tom weighed his puppy the first day he got it. It weighed 7 pounds. The next time he weighed the dog it weighed 21 pounds. How many pounds had the dog gained?

23. Jim brought 45 pounds of newspapers for the paper collection at school. Mary brought 17 pounds of paper. Jim brought how many more pounds than Mary did?

Subtracting with the Abacus



Use the abacus to do these subtractions.

A. $\begin{array}{r} 487 \\ -126 \\ \hline \end{array}$ B. $\begin{array}{r} 250 \\ -100 \\ \hline \end{array}$

C. $\begin{array}{r} 360 \\ -120 \\ \hline \end{array}$ D. $\begin{array}{r} 294 \\ -91 \\ \hline \end{array}$

1. Bill wants to do example A on the abacus. What number is he showing on the abacus?

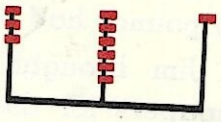
2. Bill does not know what to do next. What should he do?

3. How many markers will there be on the ones row of the abacus when 6 are taken away?

4. After Bill has taken away the tens in his example, how many markers will he have in tens place on the abacus?

5. How many markers will be left in hundreds place after Bill subtracts the hundreds?

6. Betty drew an abacus. She showed Bill's answer like this. Read the answer.



7. Make abacus drawings like Betty's. Show the answer for example B. For C. For D.

8. Bill showed subtractions B, C, and D on the abacus. Which of these subtractions did he show as he moved the markers?

$\begin{array}{r} 0 \\ -0 \\ \hline 0 \end{array}$ $\begin{array}{r} 6 \\ -6 \\ \hline 0 \end{array}$ $\begin{array}{r} 9 \\ -9 \\ \hline 0 \end{array}$ $\begin{array}{r} 8 \\ -0 \\ \hline 8 \end{array}$ $\begin{array}{r} 4 \\ -4 \\ \hline 0 \end{array}$ $\begin{array}{r} 5 \\ -0 \\ \hline 5 \end{array}$

9. If 0 is subtracted from 0, what is the difference?

10. When you take 0 from a number, what is the difference?

11. How much is left when you take a number from itself?

■ **When a number is subtracted from an equal number, there is no difference. The answer is zero.**

■ **When zero, or nothing, is subtracted from a number, the difference is the number.**

12. Find answers. Check by adding.

$\begin{array}{r} 706 \\ -701 \\ \hline \end{array}$ $\begin{array}{r} 500 \\ -300 \\ \hline \end{array}$ $\begin{array}{r} 578 \\ -470 \\ \hline \end{array}$ $\begin{array}{r} 630 \\ -230 \\ \hline \end{array}$ $\begin{array}{r} 514 \\ -504 \\ \hline \end{array}$

Borrowing When There Are Zeros in the Minuend

GARY

500 = 50 tens 0 ones
−125 = −12 tens 5 ones
37 tens 5 ones = 375

RUTH

500
−125
375

KAREN

500 = 4 hundreds 9 tens 10 ones
−125 = −1 hundreds 2 tens 5 ones
3 hundreds 7 tens 5 ones = 375

1. There were 500 sheets of paper in a package. Ann took 125 sheets from the package. The teacher told Ann to write on the package the number of sheets that were left. Did Ann write the correct number?

2. To find her answer Ann thought, "One hundred from 500 leaves 400. Twenty-five from 400 leaves 375." Use addition and show that Ann found the right answer.

3. Bill found the answer by counting backwards by 25. Give the numbers that belong in place of the question marks.

500, ?, 450, ?, ?, 375

4. Look at Gary's subtraction. What did he do when he found he could not take 5 ones from 0 ones?

5. Karen wrote 4 in hundreds place to show she had borrowed 1 hundred, or 10 tens. Why does she show only 9 tens in tens place?

6. Tell how Ruth thought as she did her subtraction.

▶ Subtract as Ruth did. Prove your answers are correct by adding.

7.	400	600	200	300	900
	−156	−327	−145	−142	−586
8.	300	500	100	100	400
	−295	−391	−34	−96	−91
9.	305	702	807	410	608
	−264	−389	−98	−293	−199
10.	280	407	720	690	750
	−34	−25	−46	−28	−83

11. Jack wants to subtract 3582 from 6000. Explain these steps.

A. 6000 − 3582

B. 6000 − 3582

C. 6000 − 3582

▶ Write answers. Check by adding.

12.	4000	8753	5000	4691
	−2736	−5784	−1652	−1999

Some Subtraction Helps

1. Today Jerry collected from 19 of his 47 newspaper subscribers. He said he would collect from the other 38 subscribers tomorrow.

Bob said, "You must mean 28, not 38. You see, 47 is about 50, and 19 is about 20. Fifty less 20 is 30. Twenty-eight is nearer to 30 than 38 is. The sensible answer is 28." Was Bob right?

2. Why did Bob use 50 and 20 when the exact numbers were 47 and 19?

3. Estimate as Bob did. Find out whether $78-29$ is nearer to 59 or to 49.

Bob's method can be used to check whether you have a sensible answer for a subtraction question.

4. Find the answers to these subtraction questions. See whether your answers are sensible.

67	82	101	301	510
-29	-35	-97	-195	-306

Ted pointed out another subtraction help. He said if he was not sure that his answer was right, he used 10 in answering such subtraction questions as $16-9=\square$.

Ted showed the class how he found the answer for $16-9$. He thought, "$16-10$ is 6. So $16-9$ is one more than 6, or 7."

5. How would Ted find the answer to $17-8$?

6. Use 10 as Ted did. Show how the answers to these subtraction questions can be found.

17	16	15	15	14	15
-8	-7	-9	-6	-8	-7

Joan made a helpful suggestion. She said, "I think of 20 when I subtract numbers like 19, 18, 17, 16, and 15.

"For $36-19$, I think this way: $36-20=16$. Twenty is 1 more than 19. My answer is 1 more than $36-20$, or $16+1=17$."

7. Use Joan's way and find the answers.

46	38	26	54	35	67
-19	-19	-18	-18	-17	-18

8. Think of 30. Find the answers, thinking as Ted and Joan did.

56	65	46	67	85	46
-29	-27	-28	-29	-27	-28

9. Think of 40. Find the answers, thinking as Joan and Ted did.

68	95	87	58	67	88
-39	-37	-38	-39	-38	-39

Subtraction Problems

As you have been subtracting, you have been answering questions like:

- How many are left?
- There are how many more?
- There are how many less?
- What is the other part?
- What is the difference?

Read the facts given for each statement below. Ask a subtraction question about the facts. Find the answer to your question.

1. A grocer had 48 bars of soap. He sold 9 of the bars.

2. There were 24 cans on the counter. Fifteen cans contained pears. The others were cans of peaches.

3. There is room for 36 boxes on the shelf. There are now 19 boxes on the shelf.

4. Jack walks 14 blocks to school. Jim walks 9 blocks to school.

5. A tank holds 50 gallons when full. There are now 39 gallons of water in the tank.

6. Bill delivered 24 papers for John. John had 83 papers to deliver in all.

7. The class had 95 tickets to sell for the school play. The class has sold 27 tickets.

8. For a folk dance, 40 children are needed. Only 26 children have agreed to take part.

9. There are 35 spelling words to be studied. Henry has studied 17 of the spelling words.

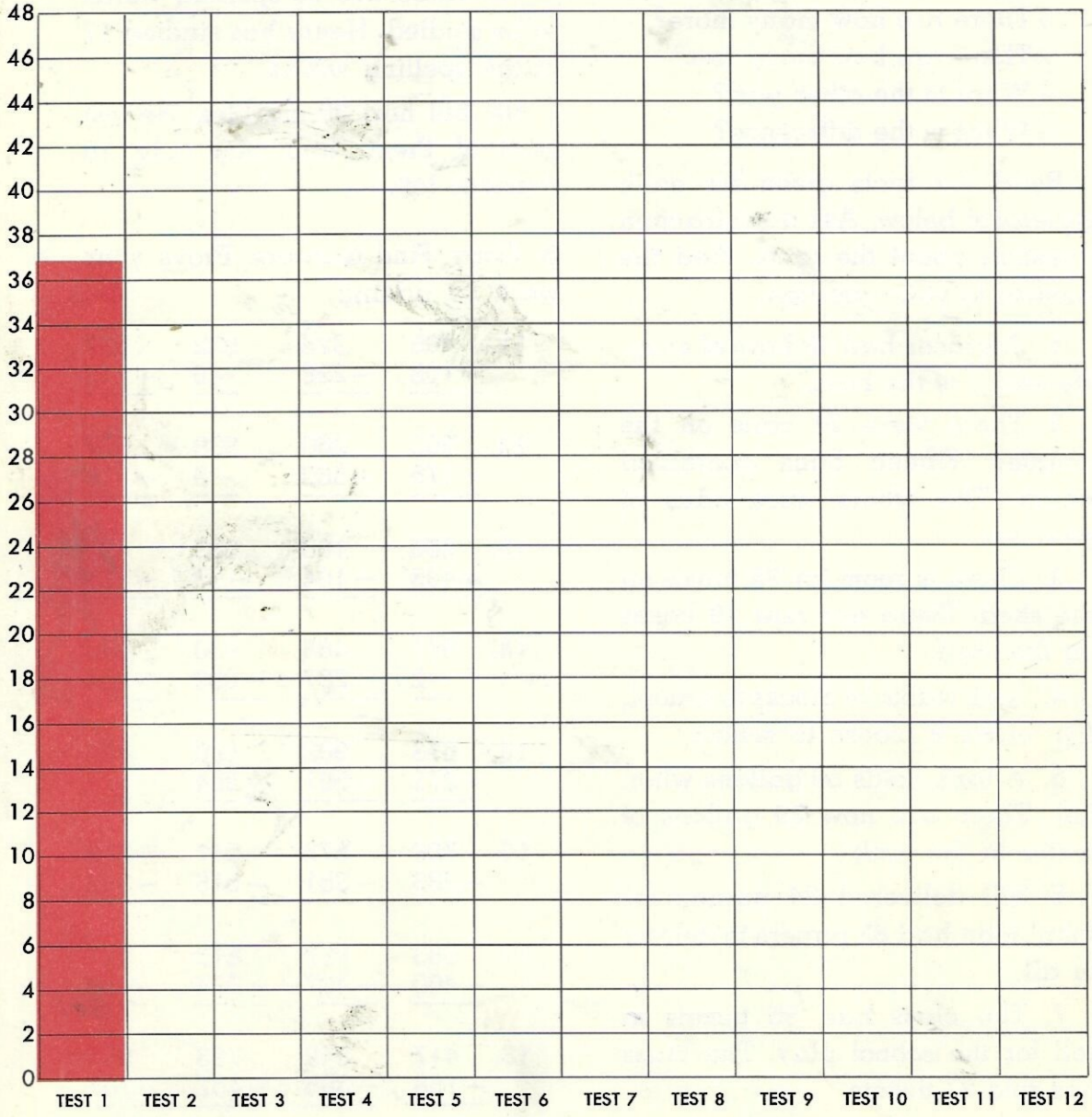
10. Bill had 36 marbles. He lost part of them, and has only 18 marbles left.

▶ Copy. Find answers. Prove your work by adding.

11.	495 − 108	328 − 228	932 − 6	537 − 249
12.	500 − 175	960 − 560	839 − 8	527 − 315
13.	586 − 493	165 − 104	685 − 99	437 − 168
14.	571 − 2	468 − 287	900 − 699	540 − 254
15.	673 − 273	902 − 591	890 − 384	400 − 5
16.	709 − 283	873 − 351	947 − 516	819 − 342
17.	583 − 400	892 − 407	813 − 374	941 − 39
18.	417 − 168	842 − 385	793 − 452	561 − 107

BOB SMITH

Graph of My Scores on "Taking Stock" Tests



Keeping a Record of Your Scores

In each unit of this book you will find a test called "Taking Stock." Each of these tests will have 48 examples or 48 points.

If you are doing your work well, your scores on these tests will stay near the top score of 48. If any score is low, you can improve your work by studying the things covered by the test for which you got the low score.

It will be easy to compare your scores if you make a record sheet as Bob did.

Directions for Making a Record Sheet

Use an unlined sheet of paper the size of your arithmetic notebook page.

Draw a square 6 inches long and 6 inches wide.

Mark off in half inches the top and the bottom lines of your square. From each mark at the top draw a line to the opposite mark at the bottom of the square. Your square will then be marked off into twelve one-half inch columns.

Next mark off in quarter inches the right- and left-hand sides of your square. Draw a line from each mark at the left to the opposite mark at the right. Counting the top and bottom lines and the lines you just drew, you will have 25 lines across your paper.

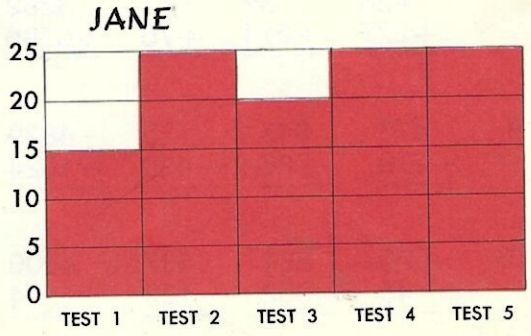
Number the lines as Bob has done. Write **Test** and the number of each test at the bottom as Bob has done.

Head your record sheet as Bob has done.

1. Bob's record, or graph, shows his score on his first test. How many examples did he get right on that test? How can you tell?

2. Now it is time for you to begin making your graph. In the column for Test 1, color or shade as many spaces as equal your score for the first "Taking Stock" test on page 18. You have this test paper in your notebook.

3. How is the following graph different from yours? What was Jane's score on each test according to this graph?



Taking Stock — Test 2

Write all of the answers on folded paper. Your teacher will tell you when to start and when to stop.

1.	15	16	17	9	7	9
	−9	−7	−8	+9	+7	+8
2.	12	11	8	14	13	6
	−5	−3	+7	−6	−9	+8
3.	9	15	9	7	18	12
	+7	−8	+5	+6	−9	−4
4.	8	16	14	8	14	15
	+5	−7	−9	+8	−8	−6
5.	35	53	27	48	84	93
	−6	−8	−9	−9	−7	−5
6.	75	83	92	46	31	59
	−26	−37	−18	−32	−14	−49

7.	668	419	690	4363
	24	148	285	97
	426	39	7	3282
	+227	+574	+75	+6395
8.	475	846	735	4829
	−278	−526	−423	−1024
9.	600	684	937	5000
	−45	−352	−129	−4

10. Check your answers as someone reads the correct ones. Write your score at the top of your paper.

The score you make will help you to find out how much you have learned in addition and subtraction.

11. Now you can make the second bar, or colored column, on your graph. Color, or shade, as many spaces as will show the score you made on this test.

Since this is Test 2, in which column will you color?

If your score is an odd number, how will you show the number on your graph?

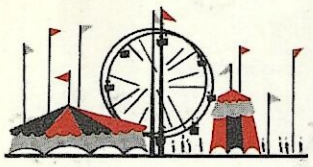
12. To improve your work, copy the examples you missed. Work them again. Find out why you did not get the right answer.

Do the subtractions on pages 31, 33, and 37. If you are having trouble with your basic subtraction facts, study page 323.

Page 34 will help you if you are having trouble with zeros.

13. Put your paper for "Taking Stock," Test 2, in your arithmetic notebook.

Writing the Number Question



MARY JONES

1. 6230 + 8114 ?

2. 243 + 321 + 309 ?

3. 84 + 79 ?

You must always read a problem through carefully. Decide which facts you need to solve the problem. Then write the number question for the problem.

Mary wrote the number questions for the first three problems before she answered any of them. Which questions did she get wrong?

1. Mary read that the total attendance at the fair was 29,518 persons. The attendance on Thursday was 6230. On Wednesday it had been 8114. How many more persons attended the fair on Wednesday than on Thursday?

2. The Bates School has 243 children in the primary grades. There are 321 children in the middle grades and 309 in the upper grades. How many children go to the Bates School?

3. The school nurse says that, according to a height-weight chart for girls, Jane should weigh about 84 pounds. She weighs only 79 pounds. How many pounds is she below the usual weight for girls of her age and height?

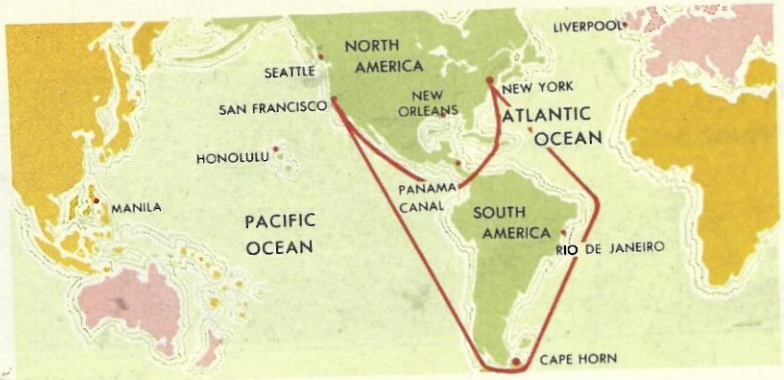
Write the correct number questions for problems 1 through 6. Answer them.

4. Jack has 314 United States stamps, 77 British stamps, 64 French stamps, and 98 Dutch stamps. How many more stamps does he have from the United States than from France?

5. On a shopping trip Sue paid these amounts for things she bought: meat, $2.14; vegetables, $.85; cake, $.75; and flour, $1.97. How much was her bill for all of these things?

6. Gary has three storybooks. In one there are 308 pages. In another there are 198 pages. In the third book there are 215 pages. The longest book has how many more pages than the shortest book?

Using Facts from a Table



The Panama Canal was opened for use in 1914. Before that time, ships, in going from the Atlantic to the Pacific Ocean or from the Pacific to the Atlantic, had to go around South America.

The table at the bottom of the page gives the distance between certain places shown on the map, both by way of the Panama Canal and around South America.

1. How far is it from New York to San Francisco if you go around South America?

2. How far is it from New York to San Francisco if you go through the Panama Canal?

3. Find how many miles are saved by taking the route through the Panama Canal from New York to San Francisco.

4. Between which two cities in the table is the distance around South America nearly the same as the distance through the Panama Canal?

5. Begin with Honolulu and New Orleans. For each pair of cities given in the rest of the table, find how many miles are saved by going through the Panama Canal.

FROM	TO	MILES AROUND SOUTH AMERICA	MILES THROUGH PANAMA CANAL
New York	San Francisco	15,348	6,059
Honolulu	New Orleans	15,942	7,051
Seattle	Liverpool	16,806	10,014
Rio de Janeiro	San Francisco	8,339	7,678
New York	Manila	19,530	11,585
New Orleans	San Francisco	13,644	4,698

Rounding Large Numbers in Subtraction

1. Why do people very often use round numbers when talking of distances between cities?

2. Round the numbers to the nearest thousand. Find the distance from New York to San Francisco through the Panama Canal.

3. Read each of the distances in the table on page 42 in round numbers to the nearest thousand.

4. Round the numbers to the nearest thousand. Find the number of miles saved by going from New York to San Francisco through the canal instead of around South America. Will your answer be the same as if you used exact numbers?

5. Estimate in round numbers to the nearest thousand the number of miles saved by using the Panama Canal route on trips between the cities in the table on page 42. Omit the trip from Rio de Janeiro to San Francisco.

6. Between which two cities is the greatest distance saved?

7. Would rounding the distance first and then subtracting give you the same answer as subtracting the actual distances and then rounding the answer? Which way is quicker? Which is easier?

8. Use round numbers to the nearest thousand. Try to find the number of miles saved by using the canal route from Rio de Janeiro to San Francisco. Can you get a sensible answer?

■ **If the numbers to be rounded have about the same number of thousands, it is better to round the numbers to the nearest hundred.**

9. Use numbers rounded to the nearest hundred. Find a reasonable answer for problem 8.

No Pencils, Please!

1. What kind of number question is used to answer, "How many more are needed?"

2. To show six thousand four on an abacus, you will use how many marks?

3. In $16-7=9$, which number is the minuend?

4. What number equals one hundred sixteen tens and nine ones?

5. Read: \$546,130,315.85.

MIDLAND DAILY NEWS
ONE HUNDRED ANGRY FANS DEMAND REFUND
Vol. 25 — No. 124 ..... Section A ..... Five Cents
Close Decision Displeases Some Fans

Using Round Numbers and Borrowing

1. The news story said 93 fans demanded a refund after the game. Why does the headline of the paper say 100 fans?

2. If the newspaper had rounded to the nearest 10, how would the headline have read?

3. Estimate how many did not demand a refund if there were 1216 persons at the game and 93 did demand a refund. Round the numbers before you subtract.

4. For problem 3 did you round to the nearest ten, or to the nearest hundred? Which will give an answer nearer to the exact answer? Do all the work necessary to show that your answer is correct.

Round each of the following numbers to the nearest hundred. Write answers only.

5.				
	819	607	1655	6783
	−343	−261	−916	−2900

Round each number to the nearest ten. Write only the answers.

6.					
	64	52	264	764	1691
	−37	−21	−83	−598	−1203

7. What do you think and what do you write when you borrow in subtraction? Did Carol or Joe use the quicker way?

CAROL	JOE
36	36 = 3 (11) 6
−18	−18 = −1 8
18	1 8

Write answers only. Use exact numbers.

8.					
	86	41	92	37	382
	−37	−36	−69	−18	−164

You may write helping figures as Joe did if you wish. As you get stronger in subtraction, try to stop writing them.

Write Answers Only

1. How many tens are 14 tens subtracted from 22 tens?

2. Counting backwards by 2's four times from 23 is the same as taking what number from 23?

3. What is left in hundreds place after borrowing in this example?

$$634 - 467 = \square$$

4. Which number is the subtrahend in this example?

$$\begin{array}{r} 1341 \\ -675 \\ \hline 666 \end{array}$$

5. To prove that 666 is the right answer in $1341 - 675 = \square$, you would add what numbers?

6. How many figures will you need to write the difference between 740 and 683?

7. What number fact is used when you solve this problem:

Mary had 16¢. She spent 7¢. How much money did she have left?

8. What number fact is used when you solve this problem:

Jerry had a score of 8 points. He won 9 more points. What score did he have then?

9. Jack had 15 words to learn. He now knows 8 of them. How many more must he learn?

10. Jim got a score of 17 on an arithmetic test. Ann's score was 9. What was the difference between their scores?

11. Mary did 6 problems today and 9 problems yesterday. How many has she done?

12. Mary peeled 5 apples. Her mother told her to peel 8 more. How many did Mary peel in all?

13. Joan needs 15 sheets of paper for a booklet. She has 8 sheets. This is how many sheets less than she needs?

Write answers on folded paper.

14.

78	95	84	67	59
+26	−37	−48	+23	−31

15.

603	808	2406	697
−426	−709	+3894	−693

16.

286	65		673
57	9	6200	19
+654	+745	−5195	+4825

17.

5960	6007	7000	5167
−5	+97	−44	+2854

18.

23	45		
463	24		1364
7	87	532	2165
291	42	312	3004
25	31	415	1327
425	63	224	1463
+123	+27	+406	+1060

Subtracting Money Numbers

1. Charles bought a ticket costing 54 cents. He gave the ticket seller 75 cents. When she gave him his change, she said, "54 cents, 55 cents, 65 cents, 75 cents." What coins did she give Charles in change? How much change was this?

2. Charles thought, "Does 54 cents from 75 cents leave only 21 cents?" Write the number question that will help him find out if the change is 21 cents.

3. Will either one of these number questions be all right for the problem Charles wants to solve? Explain.

75¢	$.75
−54¢	−.54

4. If you wrote "Three dollars subtracted from four dollars and fifteen cents" in figures, would you use the cents sign, or the dollar sign and decimal point?

5. Some of these examples would be in better form if the money signs were changed. Which are these?

279¢	56¢	$5.25	$.10	108¢
−135¢	−27¢	−.36	−.07	−98¢

6. Subtract:

$7.35 from $9.27

$0.92 from $3.25

$8.45 from $15.32

$0.78 from $22.16

7. Subtract eighteen dollars and three cents from twenty dollars and seventy-nine cents. Use figures.

8. One store charges $23.50 for an electric toaster. A nearby store sells the same kind of toaster for $19.98. What is the difference between the two prices?

9. Jerry is saving money to buy a bicycle costing $44.95. He has saved $29.67. How much more must he save to be able to pay for the bicycle? How much more would he need if the bicycle cost only $38.95?

Making Change

Harry asked Ted if he had to use a pencil to find out the amount of change to give a customer. Ted said, "Making change is very easy. I don't subtract. I add as I make change." Here is how Ted helped Harry to understand.

1. Mrs. Brown bought a tube of tooth paste for 39¢. She gave me a half dollar. I gave her 1 cent to make 40¢. What other coin did I give her to make 50¢, or the amount she gave me?

2. Mary bought a 6-cent stamp. She gave me 25¢. I gave her 4 cents to make 10¢. Then I gave her a dime. What other coin did I give her to make 25¢, or the amount she gave me?

3. Mr. Smith bought a quart of ice cream costing 49¢. He gave me a dollar bill. I gave him 1¢ to make 50¢. What other coin did I give him?

4. Mrs. West bought a box of candy costing $1.25. She gave me a five-dollar bill. I gave her a quarter to make $1.50. What coin did I give her to make $2.00? How many dollar bills did I then give her?

What change would you expect to receive from each of these purchases if you gave the storekeeper $1.00? Name the coins in the order he would give them to you.

5. 83¢ 54¢ 93¢ 27¢ 34¢
6. 75¢ 45¢ 23¢ 65¢ 57¢
7. 15¢ 25¢ 39¢ 58¢ 89¢

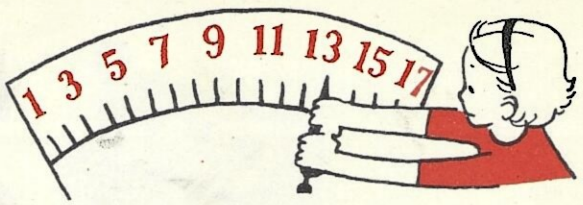
Count the change for each of the following purchases, if paid for with a five-dollar bill.

8. 75¢ 55¢ $1.80 $2.95
9. 63¢ 19¢ $3.25 $4.57
10. 46¢ 70¢ $1.05 $2.47

Subtract and find how much you save when you buy:

11. a $45 coat for $39.95
12. a $22.95 radio for $19.00
13. a $10 book for $4.98
14. a $15 hat for $7.89

How Well Have You Learned?



Do these exercises. The pointer on the dial will show you how well you have learned the work of this unit.

1. Use a number line to show the answer: $26 - 17 = \square$.

2. Show on a number line what you do when you count backwards by 3's from 27 to 18.

3. Use the words hundreds, tens, and ones to show the borrowing in this example: 296 from 430.

4. Show two ways of writing money numbers with figures. Use this example: thirty-eight cents subtracted from seventy-five cents.

5. Write the number question for the following problem.

Joe is ticket taker at a theater. In the afternoon he took 87 tickets. That evening he took 136 tickets. How many more did he take in the evening than in the afternoon?

6. Round 36,483 to the nearest thousand.

7. Write two hundred seventeen dollars and six cents with figures.

8. Estimate to the nearest hundred the difference between 834 and 687.

▶ Write answers on folded paper.

9.

\$0.85	\$0.51	\$0.40
−.04	−.39	−.36

10.

\$1.25	\$1.00	\$140.00
−1.12	−.71	−.07

11.

685	794	1002	400
−59	−37	−309	−397

12.

374	1327	5273	8
142	2835	1352	462
523	1738	406	16
238	2009	27	902
+400	+1405	+1724	+46

13.

			25
25			52
173			34
14		4208	70
400		516	17
70	4290	7409	4
+375	−2990	+34	+2

14.

15	17	14	13	18
−6	−9	−6	−8	−9

15.

7	9	5	6	8
+7	+3	+8	+9	+9

16.

14	9	15	16	8
−5	+9	−7	−9	+8

17.

28	25	57	36	54
−9	+8	+7	−9	+8

Help Yourself to Improve

If the pointer on the dial went far to the right, you know the work of this unit very well.

If the pointer on your dial did not go very far to the right, you need some help. Do the work on this page. The red figures show pages where the work was taught.

1. Which number is the subtrahend in the subtraction $834 - 619 = 215$? (32)

2. Subtract 398 from 500. Use addition to prove your answer. (32)

3. Below are the names of five states and the area of each state in square miles. Read the area of each state rounded to the nearest thousand. (43)

California	158,693
Maine	33,215
Nebraska	77,227
New York	49,576
Texas	267,339

4. Use numbers rounded to the nearest thousand. Estimate the difference between the area of Maine and the area of Nebraska. (43)

5. What figures would come after the decimal point if you wrote 316¢ using the dollar sign and decimal point? (14)

6. Write three different questions that can be answered by subtraction. (37)

7. Use a number line. Show what numbers you say as you count backwards by 6's from 60 to 30. (27)

8. Write the answers on folded paper. (34)

8	0	7	9	5	4	1
−8	−0	−7	−9	−0	−0	−1

9. Write answers on folded paper. (29)

25	56	34	55	73	81
−8	−9	−7	−8	−6	−5

Write the answers. Use helping pages when you need them.

10. (31)

81	96	45	70
−59	−28	−37	−34

11. (34)

907	600	680	227
−508	−295	−280	−120

12. (35)

8000	5483	5169
−2894	−1842	−3299

13. (46)

$146.69	$12.75
−32.87	−9.48

14. Name the coins you might get as change if you spent 68¢, and gave the clerk a dollar bill. (47)

Show That You Know

1. Write eighty-six tens in figures. Write eight hundred sixty in figures. What do you notice about the two numbers you have written?

2. How many marks do you need to show seven thousand on an abacus?

3. If you show four thousand ten on an abacus, how many marks will you have in ones place? In hundreds place?

4. Subtract four from four thousand.

5. Find the number that is 382 less than 762.

6. 890 is 600 more than what number?

7. Mrs. Brown had $15.50. After she bought her groceries, she had $3.95 left. How much did she spend for groceries?

8. Ann had 90 dimes in her dime bank. How many cents would this be? How many dollars?

9. What is the difference between $18.75 and $25.00?

10. What number is $12.50 more than $37.50?

11. Mary bought a book for $1.19. This was 81 cents less than the book that Alice bought. What did Alice pay for her book?

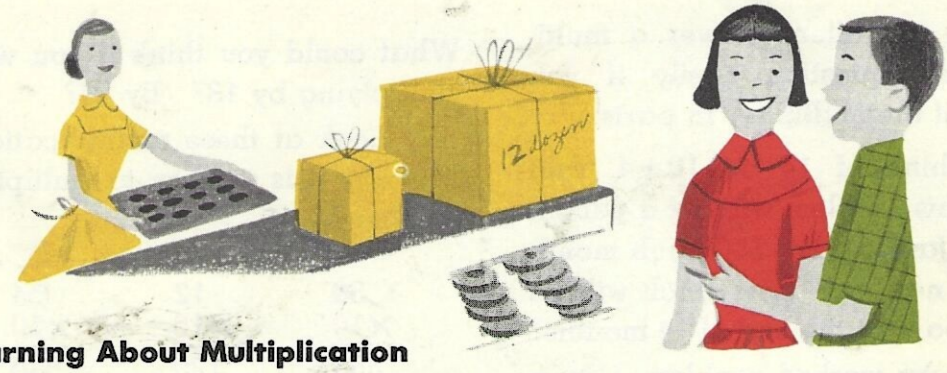
12. Jerry's room brought 955 pounds of newspaper for the waste paper drive. Sue's room brought 1005 pounds of paper. Sue's room brought how many more pounds than Jerry's room did?

13. A Cub Scout Pack collected 9500 pounds of waste paper. This was 745 pounds more than the collection of the previous year. How many pounds were collected the previous year?

14. Jim's Cub Scout Pack had planned a camping trip that would cost $138.00. The Pack made $49.65. How much more did they need to go on the camping trip?

Copy. Find the answers. Prove your answers by addition.

15.	345	915	$15.89
	−168	−427	−10.09
16.	800	637	7294
	−49	−590	−3195
17.	689	410	$24.95
	−89	−256	−.65
18.	593	900	7154
	−347	−6	−2869
19.	706	649	1589
	−504	−609	−217



Learning About Multiplication

Bill and Jane were shopping at the doughnut bakery. They saw a box of 12 dozen doughnuts ready for delivery. Bill said, "There are 144 doughnuts in that box."

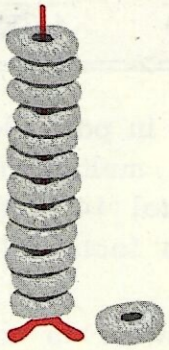
Jane asked how he found the answer so easily. Bill explained in this way:

12 dozen equals 12×12.
12 is the same as $10+2$.
10 12's equal 120.
2 12's equal 24.
$120+24=144$.

1. Use Bill's way. How many doughnuts would there be in an order of 15 dozen? In 24 dozen? In 32 dozen?

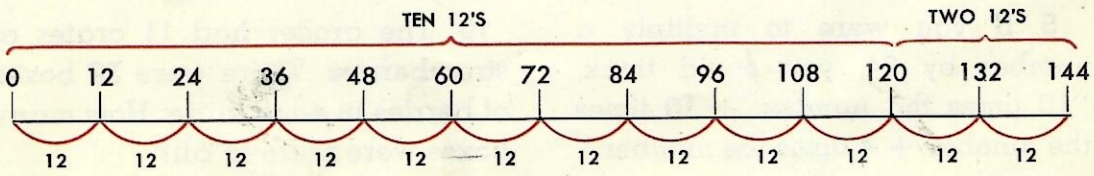
2. Sue said Bill could have found 12×12 by counting by 12's. She wrote this to show what she meant. Was she right?

SUE



12 →	12
+12 →	24
+12 →	36
+12 →	48
+12 →	60
+12 →	72
+12 →	84
+12 →	96
+12 →	108
+12 →	120
+12 →	132
+12 →	144

3. Look at the number line. Does the work above the line show Bill's way, or Sue's way? Explain the work below the number line.



Multiplying by Using the Parts of a Number

You can often answer a multiplication question easily if you think of the multiplier in parts.

1. Think of 14 as 10+4, and work this problem without a pencil.

Mr. James pays $50 each month on his new car. How much will he have paid at the end of 14 months?

2. Jerry worked problem 1 in a different way. Explain his work.

14×$50=?		JERRY
$50	$50	$350
×7	×7	+350
$350	$350	$700

3. To think of 14 in parts, Jerry had to know the multiplication fact, "Two 7's equal 14." What other multiplication facts did he use?

4. Find the answers to these multiplication questions without a pencil. Then write how you thought to find your answer.

50	60	22	21	35
×12	×14	×16	×14	×22

5. If you were to multiply a number by 24, you could think, "10 times the number + 10 times the number + 4 times the number." What could you think if you were multiplying by 13? By 32?

6. Look at these multiplications. Tell why it is so easy to multiply a number by 10.

36	12	54
×10	×10	×10
360	120	540
87	69	48
×10	×10	×10
870	690	480

Show an easy way to do the multiplication in problems 7-10.

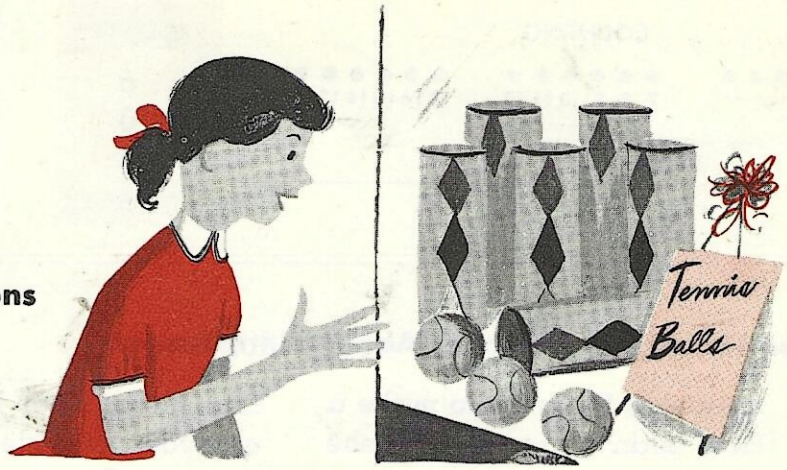
7. A trip around the lake near Jim's house is 15 miles. An excursion boat makes 12 round trips each week. How far does the boat travel in making these trips?

8. The distance Bob walks on his paper route is 30 blocks. How many blocks does he walk when he goes over this route 12 times?

9. John's father drove an average of 26 miles per day last week. How many miles did he drive in the 7 days?

10. The grocer had 11 crates of strawberries. There were 32 boxes of berries in each crate. How many boxes were there in all?

Multiplication Number Questions



1. Ann said she saw six cans of new tennis balls in a store window. There were 3 balls in each can. She said she wished she had that many tennis balls. If she did, how many balls would she have?

2. Bill said you could find how many balls if you pointed to each can and counted by 3's, as, 3, 6, 9, 12, 15, 18.

$$\begin{array}{r} 3 \\ +3 \\ \hline 6 \\ +3 \\ \hline 9 \\ +3 \\ \hline 12 \\ +3 \\ \hline 15 \\ +3 \\ \hline 18 \end{array}$$

Tom wrote the addition at the left. How many 3's did he write? How did he find how many six 3's equal?

3. Mary said, "When you think how many are $3 + 3 + 3 + 3 + 3 + 3$ you are using an **addition number question.**

"This way is not very quick. A much shorter way to ask the same question is: How many are six 3's?"

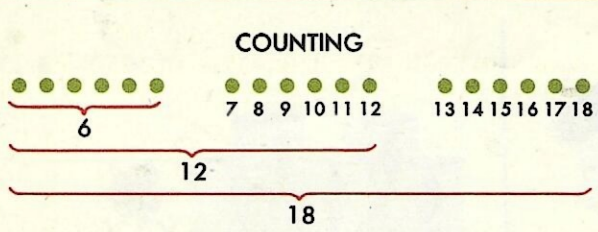
If you know your basic multiplication facts well, you do not need to count or add. You can answer the **multiplication question** quickly, and say: "Six 3's are 18."

What multiplication question would you ask if there were 4 balls in each of the six cans and you wanted to know the total number of balls?

What multiplication question would you ask if there were 8 balls in a can?

4. See how well you remember the basic multiplication facts. Answer these multiplication questions quickly.

How many are eight 5's?
How many are seven 4's?
How many are six 9's?
How many are nine 4's?



ADDING

$$\begin{array}{r} 6 \\ 6 \\ +6 \\ \hline 18 \end{array}$$

MULTIPLYING

Three 6's = 18

Some Things to Remember About Multiplication

1. Joan uses 6 apples to make a pie. How many apples will she need for 3 pies?

What are three ways in which Joan can answer her number question?

Which of these ways is quickest?

■ **Multiplication is a short way of finding the total when you are putting equal groups of things together.**

2. Mary put 4 plums on each plate. There were 7 plates. How many plums were there in all? Find the answer by adding. Then find the answer by multiplying. Which is the shorter way?

3. Mary put 6 doughnuts on the first plate, 5 doughnuts on the second plate, and 3 doughnuts on the third plate. What was the total number of doughnuts? Can you find the answer by adding? Why are you not able to find the total by multiplying?

4. Write each of these addition questions as a multiplication question.

$5+5+5+5+5=$?

$6+6+6+6=$?

$9+9+9+9+9+9=$?

5. You can write and read a multiplication number question in different ways. Look at the multiplications at the bottom of the page. Give a number question for each multiplication.

■ **The multiplication sign × is read "multiplied by," or "times."**

6. In multiplication D below, which number tells the size, or the number of things, in one of the equal groups?

A. Three 6's = 18

B. 3 times 6 = 18

C. $3 \times 6 = 18$

D.
$$\begin{array}{rl} 6 & \text{multiplicand} \\ \times 3 & \text{multiplier} \\ \hline 18 & \text{product} \end{array}$$

■ **The multiplicand tells the size, or the number of things, in one of the equal groups.**

7. In multiplication D on page 54, which number tells how many equal groups are to be put together?

■ **The multiplier tells how many equal groups are to be put together.**

8. Jane studies 5 spelling words a day. How many will she study in 8 days?

Which number in this problem tells the size or the number of things in one of the equal groups? That is, which number is the multiplicand?

How many equal groups are to be put together?

Write the basic multiplication fact for this problem.

9. Each pupil needs 4 pieces of cardboard. How many pieces will 9 children need?

Write the basic multiplication fact for this problem. Label the multiplicand, or the number that tells the size of one of the equal groups.

For problems 10 and 11 write the basic multiplication fact for each problem. Label the multiplicand, multiplier, and the product in each fact.

10. Jerry works 6 examples on each sheet of paper. How many examples can he work on 7 sheets of paper?

11. Mother seated 4 persons at each card table. How many did she seat at 5 card tables?

12. Mary gave 4 cookies to each child. How many cookies did she give to 7 children?

Mary drew this picture. She said the picture showed she could use multiplication to find her answer. Explain what Mary meant.

13. Ellen used 3 sheets of paper to do her arithmetic, 2 sheets to write a composition, and 6 sheets to make a science notebook. How many sheets did she use in all?

Ellen drew this picture. She said it showed that she could not find the total by multiplying. Explain what she meant.

Basic Multiplication Questions

If you are to do well in multiplication, you must be able to answer the basic multiplication questions quickly.

■ **The basic multiplication facts are the facts in which a one-figure number is multiplied by another one-figure number.**

▶ See how many basic multiplication facts you know. Write the products on folded paper.

1.	9 ×3	5 ×4	9 ×4	8 ×6	5 ×5	9 ×5
2.	3 ×6	4 ×7	8 ×5	9 ×2	5 ×6	2 ×6
3.	3 ×2	8 ×7	4 ×8	7 ×3	4 ×6	3 ×3
4.	8 ×2	6 ×6	2 ×5	4 ×3	5 ×3	2 ×4
5.	2 ×7	4 ×4	7 ×5	9 ×9	7 ×7	6 ×7
6.	9 ×6	8 ×8	2 ×2	9 ×8	8 ×3	9 ×7

Use page 325 to check your answers. Keep this paper in your notebook. Make a list of the facts you did not know. Show these facts on a number line.

▶ Use folded paper. Write the products.

7.	3 ×9	4 ×5	4 ×9	6 ×8	5 ×5	5 ×9
8.	6 ×3	7 ×4	5 ×8	2 ×9	6 ×5	6 ×2
9.	2 ×3	7 ×8	8 ×4	3 ×7	6 ×4	3 ×3
10.	2 ×8	6 ×6	5 ×2	3 ×4	3 ×5	4 ×2
11.	7 ×2	4 ×4	5 ×7	9 ×9	7 ×7	7 ×6
12.	6 ×9	8 ×8	2 ×2	8 ×9	3 ×8	7 ×9

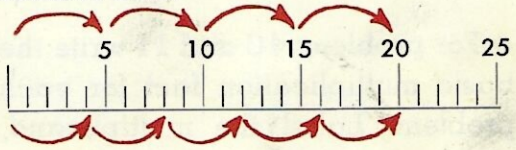
Use page 325 to check your answers.

13. Compare your answers for rows 1-6 with the answers for rows 7-12. What do you notice? Explain.

14. In what way are these two facts related?

4	5
×5	×4
20	20

15. What two related multiplication facts are shown on this number line?



Studying Multiplication Facts

1. Study any multiplication facts that you do not know well. Page 30 will help you if you have forgotten the steps.

2. Make up practice for yourself. That is, write rows of one-figure numbers. Multiply each number by a one-figure number. Work fast. Page 325 will help you check your work.

PRODUCT SIDE

QUESTION SIDE

Make a set of "basic product" cards. One side of a card will be like the card at the left above. The large figure is the product. The small figure tells how many basic multiplication questions have this product.

On the other side of this product card the three basic multiplication questions are written, as shown in the other picture.

The card whose two sides are pictured here will help you make your basic product cards. At the bottom of the page you will find the products for which you will make cards. The number in the circle tells you how many multiplication questions to write for each product.

3. With which product will each of these groups of multiplication questions belong?

2×2 4×1 1×4	2×4 4×2 1×8 8×1	3×4 4×3 2×6 6×2	6×6 4×9 9×4
4×8 8×4	2×9 9×2 3×6 6×3	2×5 5×2	3×8 8×3 4×6 6×4
1×1	2×1 1×2	5×8 8×5	7×8 8×7

1 (1)	2 (2)	3 (2)	4 (3)	5 (2)	6 (4)	7 (2)	8 (4)	9 (3)	10 (2)	12 (4)	14 (2)
15 (2)	16 (3)	18 (4)	20 (2)	21 (2)	24 (4)	25 (1)	27 (2)	28 (2)	30 (2)	32 (2)	35 (2)
36 (3)	40 (2)	42 (2)	45 (2)	48 (2)	49 (1)	54 (2)	56 (2)	63 (2)	64 (1)	72 (2)	81 (1)

Some Multiplication Helps

1. Use your set of basic product cards in this way. Look at the product. Give as many multiplication questions as the number in the ring tells you to give. Then look at the multiplication questions on the other side of the card. Learn any questions that you did not give correctly.

2. Work with a partner. See how fast you or your partner can say the multiplication questions while looking at the product side of a basic product card. The other partner should watch the question side of the same product card.

3. Write the products quickly.

20	11	61	40	71	31
×7	×4	×2	×6	×5	×8

4. In which multiplications in row 3 did you use each of these?

$4 \times 1 = 4$ $2 \times 1 = 2$ $8 \times 1 = 8$

Did you have these products right? Remembering the rule below will help you.

■ **When 1 is multiplied by a number, or when a number is multiplied by 1, the product is the number.**

5. In which examples in row 3 did you use these multiplications?

$7 \times 0 = 0$ $6 \times 0 = 0$

You got the right answers if you thought of the zero fact in this way:

$7 \times 0 = 0$ means the same as

$0+0+0+0+0+0+0=0$

■ **When one of the two numbers to be multiplied together is 0, the product is zero.**

6. Turn to page 52. Read the examples that show that the rule below is true.

■ **To multiply a number by 10, place a zero at the right of the number.**

7. On a number line show that 3×5 has the same product as 5×3.

8. Draw dots to show that 24 is the same as 2 tens and 4 ones.

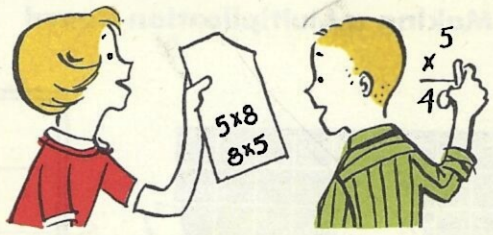
9. Change the multiplier into 10's and 1's. Find the product.

15	25	20	14	36	32
×13	×24	×15	×22	×12	×21

10. Why are you not able to write all of these additions as multiplication facts?

6			3	5	
6	4	5	3	2	
6	2	5	3	3	9
6	7	5	3	6	9
+6	+5	+5	+3	+8	+9

7	multiplicand	7	factors
×6	multiplier	×6	
42	product	42	product



11. In multiplication the numbers that are multiplied are called the **factors.** If the product is 36, and one factor is 4, what is the other factor?

Copy. Write the missing factor for each multiplication fact. Use your basic product cards if you cannot remember the factors.

12. ☐ ×8 = 32 5 × ☐ = 10
13. 5 × ☐ = 35 2 × ☐ = 16
14. 6 × ☐ = 24 4 × ☐ = 28
15. ☐ × 3 = 27 ☐ × 7 = 42
16. 8 × ☐ = 56 ☐ × 9 = 54

17. Copy and complete this table.

TABLE FOR THE 6's

1 six = 6
2 sixes = 12
3 sixes = 18
4 sixes = ☐
5 sixes = ☐
☐ sixes = 36
☐ sixes = ☐
☐ sixes = ☐
9 sixes = ☐

18. Write tables for the 7's, 8's, and 9's.

Can You Answer These Questions?

1. When you multiply 8 by 0, what is the product?

2. The product is 48. One factor is 6. What is the other factor?

3. Write this addition as a multiplication fact: 2+2+2+2 = 8

4. What four basic multiplication combinations equal 24?

5. Write two basic multiplication combinations for 42.

6. How many basic multiplication combinations can you write that will equal 25?

7. From the factors 3 and 9 you can make two related facts:

3	9
×9	×3
27	27

Write two related facts using the factors 6 and 5; 9 and 6; 8 and 7; 7 and 9; 9 and 8.

8. Draw dots. Show that the product of 3 × 6 is the same as the product of 6 × 3.

Making a Multiplication Board

	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9			18			
4	4	8		16	20	24			36
5	5								
6	6	12	18	24	30	36			
7	7						49		
8	8	16	24				?		
9	9	18							81

Gary and Don are making this multiplication board. They used a piece of plywood measuring 30″ by 30″. They marked the board off into 10 rows of 10 squares each.

In the squares across the top and down the left side, they wrote the numbers 1 through 9, as shown in the picture above. These stand for factors.

They put a hook in each of the other squares and cut out 81 cards to fit the squares. They punched a hole in the cards so the cards could hang on the hooks.

One side of the 81 cards was left blank. On the other side Gary and Don wrote basic products.

1. They have six cards left to hang on the multiplication board. How will they know where to hang the product 56? 27? 42? 63? 35? 12?

2. Explain why 81 is the last product card on the board.

3. Run your finger down row 6 until you come to the row beginning with the red 8. What product is written on the other side of the product card that is hanging there?

4. Why is 1 the first product card on the board?

Play a game with the multiplication board. When the game begins, the blank side of the 81 cards is turned toward the players. The basic products are hidden.

Two pupils take turns pointing to a card. The other player must give the hidden product for each card to which his partner points. When a product is given, the card is changed on the hook so the hidden product can be seen.

Suppose your partner pointed to the card with the red question mark shown in the picture. To find the product you would look at the factor at the top of the row. The factor is 7. Then you would look at the factor at the left of the row. The factor is 8. The hidden product is 56 because 7×8 or $8 \times 7 = 56$.

Make a multiplication board. You can use it at home or at school. It is fun to play the game, and it will improve your multiplication to play it often.

Multiplication Study Suggestions

1. Begin with 7. Count by 7's to 63. The multiplication board shown on page 60 can help you.

2. Begin with 6. Count by 6's to 54.

3. Begin with 9. Count by 9's to 81.

4. Begin with 8. Count by 8's to 72.

5. On the multiplication board the product 24 appears more than once. Why?

6. The product 36 is shown on the multiplication board three times. Why?

7. Give two sets of factors for 18. For 12. For 16.

8. See if you can think the product as fast as you glance at the multiplication questions.

7	9	8	4	3	8
$\times 3$	$\times 6$	$\times 7$	$\times 9$	$\times 8$	$\times 9$
7	5	8	7	5	8
$\times 6$	$\times 7$	$\times 4$	$\times 9$	$\times 9$	$\times 3$
6	4	9	5	9	5
$\times 8$	$\times 8$	$\times 3$	$\times 8$	$\times 9$	$\times 6$

9. Read across the multiplication board on page 60 beginning at the left. Give the products that are hidden in each row.

10. The product is 28. One factor is 7. What is the other factor?

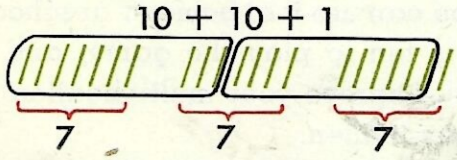
Proving Answers in Multiplication

1. What do you do to prove that an addition is correct?

2. How can you prove that your answer is correct in subtraction?

You can also prove that your answers in multiplication are correct.

3. Does this drawing show that three 7's = 21? Explain.



4. Make a drawing to show that four 8's = 32, or 3 tens and 2 ones.

5. Jerry proved a multiplication by using the number line. What was the multiplication?

6. Tom wanted to prove that $4 \times 8 = 32$. He multiplied twice to prove his answer. That is, he used $4 \times 4 \times 2 = 32$. What did he do with the 8 so that he would have two multipliers?

7. Would multiplying $2 \times 8 \times 2$ give the same product as 4×8? How can you tell if you just look at the numbers to be multiplied?

8. John wanted to be sure that $12 \times 14 = 168$. He used two ways of multiplying twice.

How did he get the 3 and 4 that he used as multipliers in part A?

JOHN

A.	B.
14	14
×3	×6
42	84
×4	×2
168	168

How did he get the 6 and 2 that he used as multipliers in part B?

9. Bill checked his multiplication for 4×8 in this way.

$4 \times 8 = 32$

CHECK: $8 \times 4 = 32$

Show both of Bill's multiplications on one number line.

10. For each part, use two ways to show that the products are right.

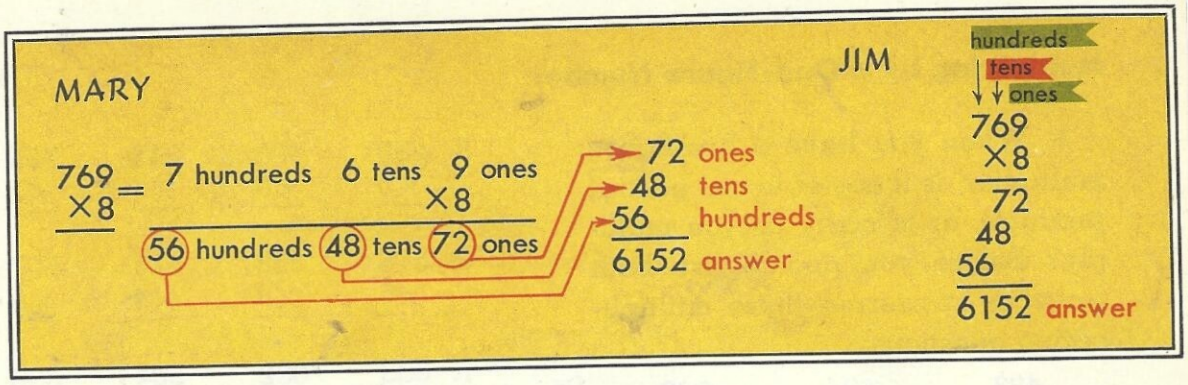
A.
$$\begin{array}{r} 20 \\ \times 16 \\ \hline 320 \end{array}$$

D.
$$\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$$

B. $6 \times 7 = 42$

C. Eight 6's = 48

11. What multiplication facts must you know before you can prove part A in John's ways?



Partial Products and Carrying in Multiplication

1. Jim and Mary wanted to find the answer to the multiplication question $8 \times 769 = ?$. Explain how Mary found her answer.

2. When Mary added the ones, tens, and hundreds together to find her answer, how did she show that 48 meant 480, or 48 tens?

How did she show that 56 meant 5600, or 56 hundreds?

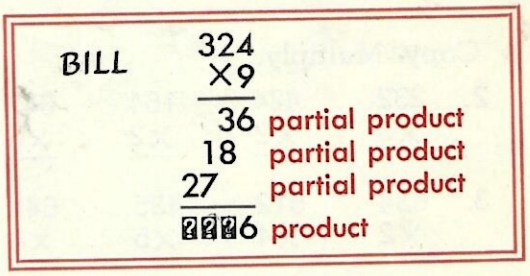
3. Jim did his multiplication in a different way from Mary's. Each time he multiplied two numbers together, he wrote the product of the two numbers.

What product did he get when he multiplied 9 ones by 8?

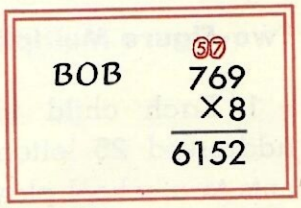
What product did he get when he multiplied 6 tens by 8? How did he show that his product was 48 tens? How did he show that the product 56 meant 56 hundreds?

4. In Jim's multiplication, the whole product is 6152. The other products (72, 48, and 56) are partial products. The partial products had to be added together to find the whole product.

5. Bill began this multiplication. Copy and find the product for him.



6. Bob worked the same example that Jim and Mary did. Instead of writing partial products, he "carried."



What number did he write when he multiplied 9 ones by 8? How many tens did he carry? Explain how he finished his multiplication.

Multiplying by a One-Figure Number

1. When you have a one-figure multiplier, is it easier to use partial products, or to carry as you multiply? Before you decide, try both ways in answering these multiplication questions.

423	634	978
×9	×7	×6

In some of the following examples you do not have to carry to find the product. In some you will carry only once, while in others you have to carry twice.

▶ Copy. Multiply.

2.	232	424	164	347
	×3	×2	×2	×3
3.	634	512	435	641
	×2	×4	×5	×8
4.	483	627	413	687
	×9	×8	×6	×4
5.	230	408	645	705
	×5	×5	×4	×7
6.	518	338	473	607
	×6	×8	×4	×9
7.	683	692	584	396
	×4	×6	×3	×7
8.	252	372	598	840
	×4	×7	×8	×9

▶ Try to think the numbers that you carry instead of writing them. Write the products on folded paper.

9.	156	425	387	398
	×5	×3	×4	×7
10.	258	415	738	561
	×8	×9	×8	×7

11. Do the multiplications in rows 2-8 again. This time think the numbers you carry.

Two-Figure Multipliers

1. Each child in Joan's class addressed 25 letters inviting parents to a school play. If there were 17 children in Joan's class, how many letters did the class address?

Joan found the answer by multiplying 17×25. She said, "17 is the same as 10+7." Explain her work.

25	25	25	175
×17	×7	×10	+250
?	175	250	425

2. Tom multiplied a better way. He multiplied 25 by 7, and wrote the answer as his first partial product.

Then he multiplied 25 by 10. He remembered that the 1 in 17 meant 1 ten, and that 1×25 in his multiplication was really 10×25, or 250. How did he show this when he wrote his second partial product?

TOM
$$\begin{array}{r} 25 \\ \times 17 \\ \hline 175 \\ 25 \\ \hline 425 \end{array}$$
175 first partial product
25 second partial product
425 product

3. Each room was given 78 tickets to sell for the school play. How many tickets was this, if there were 24 rooms in all? Look at Bill's multiplication. What did he think to find his first partial product? What did he think to find his second partial product?

BILL
$$\begin{array}{r} 78 \\ \times 24 \\ \hline 312 \\ 156 \\ \hline 1872 \end{array}$$

4. Why did Bill write the 6 in his second partial product in tens place instead of ones place?

Copy. Multiply as Bill did.

5. $\begin{array}{r} 35 \\ \times 41 \end{array}$ $\begin{array}{r} 36 \\ \times 23 \end{array}$ $\begin{array}{r} 63 \\ \times 57 \end{array}$ $\begin{array}{r} 46 \\ \times 54 \end{array}$ $\begin{array}{r} 82 \\ \times 49 \end{array}$

6. $\begin{array}{r} 59 \\ \times 68 \end{array}$ $\begin{array}{r} 83 \\ \times 28 \end{array}$ $\begin{array}{r} 34 \\ \times 48 \end{array}$ $\begin{array}{r} 73 \\ \times 23 \end{array}$ $\begin{array}{r} 62 \\ \times 57 \end{array}$

7. $\begin{array}{r} 37 \\ \times 65 \end{array}$ $\begin{array}{r} 82 \\ \times 78 \end{array}$ $\begin{array}{r} 93 \\ \times 59 \end{array}$ $\begin{array}{r} 57 \\ \times 27 \end{array}$ $\begin{array}{r} 41 \\ \times 63 \end{array}$

8. Ann's father says he drives about 375 miles each week. About how many miles will he drive in 52 weeks?

Is Ann's multiplication correct?

ANN
$$\begin{array}{r} 375 \\ \times 52 \\ \hline 750 \\ 1875 \\ \hline 19{,}500 \end{array}$$

9. How many miles would Betty's father drive in 52 weeks if he drove about 276 miles a week?

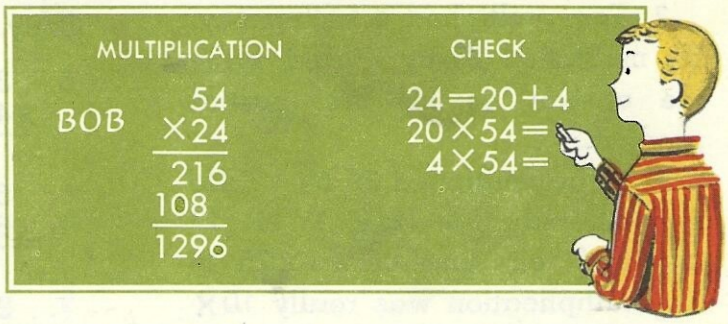
Copy. Find the products.

10. $\begin{array}{r} 714 \\ \times 23 \end{array}$ $\begin{array}{r} 285 \\ \times 48 \end{array}$ $\begin{array}{r} 241 \\ \times 17 \end{array}$ $\begin{array}{r} 954 \\ \times 75 \end{array}$

11. $\begin{array}{r} 428 \\ \times 34 \end{array}$ $\begin{array}{r} 673 \\ \times 28 \end{array}$ $\begin{array}{r} 746 \\ \times 35 \end{array}$ $\begin{array}{r} 928 \\ \times 83 \end{array}$

12. $\begin{array}{r} 984 \\ \times 17 \end{array}$ $\begin{array}{r} 563 \\ \times 46 \end{array}$ $\begin{array}{r} 918 \\ \times 53 \end{array}$ $\begin{array}{r} 457 \\ \times 42 \end{array}$

Checking Multiplication



Bob was not sure that his product was correct. He used this check:

24 is the same as 20 + 4. Then,

$20 \times 54 = 1080$

$4 \times 54 = 216$

$1080 + 216 = 1296$

1. Show how Bob could prove his answer if he thought, "54 is the same as $50 + 4$."

2. Multiply. Check by multiplying twice as Bob did.

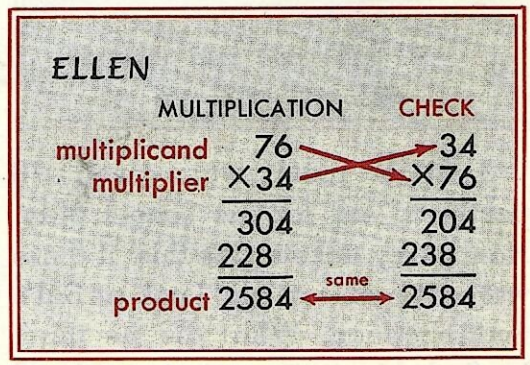
36	82	48	92	43
×24	×45	×19	×27	×31

3. Is the product of 7×8 the same as the product of 8×7? Use the number line to prove your answer. Example 15 on page 56 will help you.

Ellen said this is a good way to check multiplication:

■ **To prove that your product is correct, change the places of the multiplicand and multiplier, and multiply again.**

4. Explain Ellen's multiplication and check.



▶ Copy. Multiply. Check by changing the places of the multiplicand and multiplier, and multiplying again.

5.	24	13	25	65
	×36	×38	×48	×86
6.	39	45	58	91
	×64	×82	×26	×79
7.	63	86	63	76
	×39	×48	×78	×88

8.

56	94	38	75
×56	×74	×69	×48

9.

46	38	43	97
×97	×54	×32	×73

10. Mary multiplied 268 by 57. Study her multiplication and explain how she checked her answer.

	MULTIPLICATION	CHECK
MARY	268 × 57	57 × 268
	1876	456
	1340	342
	15,276	114
		15,276

▶ Work with a partner. After one multiplies, the other will check as Mary did. Which partner's work seems easier? Why?

11.

584	467	653	375
×42	×53	×67	×94

12.

428	659	712	653
×24	×49	×75	×84

13.

886	958	462	783
×85	×37	×79	×74

14.

938	583	285	836
×78	×94	×67	×74

15.

483	839	397	497
×51	×36	×26	×39

Multiplying the Easier Way

1. Mr. Smith drove his truck about 24 miles a day for 365 days. How many miles did he drive in all?

Why is the second multiplication easier? Always use the easier way. The meaning of the problem will help you name your answer.

24 miles	Easier Way
×365	365
120	×24
144	1460
72	730
8760 miles	8760 miles

Solve these problems. Multiply the easier way.

2. Mr. Smith sold 541 cases of eggs. There were 30 dozen in a case. How many dozen eggs did he sell?

3. If each case of eggs weighed 47 pounds, how many pounds did 541 cases weigh?

4. A man works 8 hours a day. How many hours will he work in a year of 258 working days?

5. If a man earns $15 a day each day he works, how much will he earn in 258 working days?

Three-Figure Multipliers

1. A salesman sold 432 barrels of flour. He said that, of the 432 barrels, he sold 2 barrels to the White Bakery, 30 barrels to the Rex Bake Shop, and 400 barrels to the Modern Baking Company. A barrel of flour weighs 196 pounds. How many pounds did he sell in all to the three customers?

Gary found his answer by figuring how much each customer bought. Then he added. Is his work correct?

GARY

2 × 196 lb. = 392 lb.
30 × 196 lb. = 5880 lb.
400 × 196 lb. = 78400 lb.
84,672 lb.

2. Jane got the answer by multiplying 196 by 432. What did she think to get her first partial product? Why did she leave ones place empty in her second partial product? Why did she write the 4 of her third partial product in hundreds place?

3. In what ways is Gary's work very much like Jane's multiplication?

Copy. Multiply. Check as Jane did.

4.	317 × 428	538 × 316	923 × 542	644 × 748
5.	916 × 316	423 × 625	634 × 431	261 × 287
6.	714 × 168	538 × 954	914 × 232	537 × 764
7.	279 × 169	375 × 215	569 × 365	973 × 571
8.	922 × 257	451 × 653	547 × 189	613 × 814
9.	754 × 694	421 × 353	532 × 314	842 × 339

MULTIPLY	JANE	THINK		CHECK
196 × 432		196 × 432		432 × 196
392	first partial product	392	(2 × 196)	2592
588	second partial product	5880	(30 × 196)	3888
784	third partial product	78400	(400 × 196)	432
84,672		84,672		84,672

Zero in Multiplication

1. Sue found she could not finish her multiplication. Why do you think she had trouble?

SUE

$$\begin{array}{r} 806 \\ \times 7 \\ \hline 2 \end{array}$$

2. Bob said $7 \times 0 = 0$. He told Sue that 0 plus the 4 she was carrying from ones place would make 4 the next figure in her product. He wrote this addition to show Sue what he meant. How much is $0+0+0+0+0+0+0$? Or $7 \times 0 =$?

BOB

$$\begin{array}{r} \textcircled{4} \\ 806 \\ 806 \\ 806 \\ 806 \\ 806 \\ 806 \\ +806 \\ \hline 5642 \end{array}$$

How did Bob get the 4 that he carried to tens place?

How did he get the 56 that he wrote in his sum?

3. Think of Bob's addition and tell what Sue must think to finish her multiplication.

4. How much is 9×501? Find the answer by addition. Then find the answer by multiplying.

Copy. Multiply. If you wish to check your answers, use addition.

5.	$\begin{array}{r} 409 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 203 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 901 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 503 \\ \times 7 \\ \hline \end{array}$
6.	$\begin{array}{r} 802 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 505 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 608 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 509 \\ \times 9 \\ \hline \end{array}$
7.	$\begin{array}{r} 906 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 807 \\ \times 9 \\ \hline \end{array}$	$\begin{array}{r} 406 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 802 \\ \times 7 \\ \hline \end{array}$
8.	$\begin{array}{r} 602 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 406 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 601 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} 205 \\ \times 4 \\ \hline \end{array}$

Copy. Multiply. Check by going over your multiplication a second time.

9.	$\begin{array}{r} 502 \\ \times 23 \\ \hline \end{array}$	$\begin{array}{r} 407 \\ \times 42 \\ \hline \end{array}$	$\begin{array}{r} 603 \\ \times 25 \\ \hline \end{array}$	$\begin{array}{r} 807 \\ \times 64 \\ \hline \end{array}$
10.	$\begin{array}{r} 206 \\ \times 33 \\ \hline \end{array}$	$\begin{array}{r} 504 \\ \times 84 \\ \hline \end{array}$	$\begin{array}{r} 608 \\ \times 92 \\ \hline \end{array}$	$\begin{array}{r} 902 \\ \times 18 \\ \hline \end{array}$
11.	$\begin{array}{r} 504 \\ \times 78 \\ \hline \end{array}$	$\begin{array}{r} 701 \\ \times 85 \\ \hline \end{array}$	$\begin{array}{r} 607 \\ \times 96 \\ \hline \end{array}$	$\begin{array}{r} 904 \\ \times 79 \\ \hline \end{array}$
12.	$\begin{array}{r} 309 \\ \times 27 \\ \hline \end{array}$	$\begin{array}{r} 107 \\ \times 73 \\ \hline \end{array}$	$\begin{array}{r} 205 \\ \times 68 \\ \hline \end{array}$	$\begin{array}{r} 309 \\ \times 574 \\ \hline \end{array}$
13.	$\begin{array}{r} 401 \\ \times 453 \\ \hline \end{array}$	$\begin{array}{r} 605 \\ \times 253 \\ \hline \end{array}$	$\begin{array}{r} 803 \\ \times 184 \\ \hline \end{array}$	$\begin{array}{r} 507 \\ \times 365 \\ \hline \end{array}$
14.	$\begin{array}{r} 7008 \\ \times 2 \\ \hline \end{array}$	$\begin{array}{r} 4006 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 1035 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 4024 \\ \times 8 \\ \hline \end{array}$
15.	$\begin{array}{r} 4306 \\ \times 23 \\ \hline \end{array}$	$\begin{array}{r} 1098 \\ \times 91 \\ \hline \end{array}$	$\begin{array}{r} 4106 \\ \times 75 \\ \hline \end{array}$	$\begin{array}{r} 6009 \\ \times 83 \\ \hline \end{array}$

Taking Stock — Test 3

Your score on this test will show you how well you have learned the work of Unit Three.

Copy Parts I, II, III, and IV on your paper. Leave enough room for the work of each example.

The teacher will tell you when to begin working the examples and when to stop.

PART I

1.	6 × 8	5 × 9	4 × 8	7 × 8	4 × 7
2.	6 × 9	8 × 9	6 × 7	7 × 7	4 × 6

PART II

3.	11 × 8	36 × 4	54 × 9	87 × 5
4.	340 × 7	492 × 6	255 × 3	826 × 6

PART III

5.	24 × 16	42 × 25	86 × 23	234 × 25
6.	356 × 46	892 × 437	503 × 8	

PART IV

7.	808 × 6	902 × 23	705 × 18	3640 × 31

Give yourself 1 point for each correct example in Part I. Give yourself 2 points for each correct example in Parts II, III, and IV. If you got all your work right, your score will be 48 points.

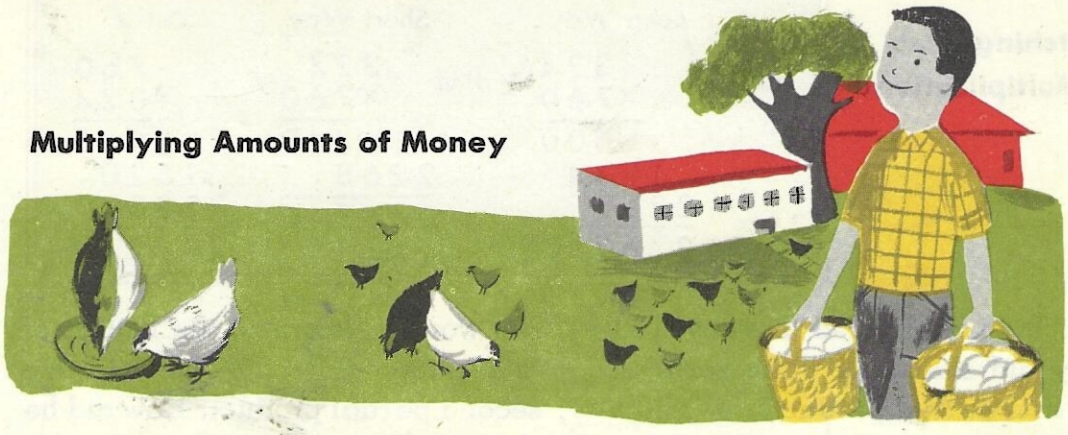
On the graph in your notebook shade or color as many places in the column for Test 3 as equal your score on this test.

Does your graph show that your work is improving? Study the combinations that gave you trouble in Test 3.

Adding and Subtracting Money

1. $4.12 + $1.32 + $6.18 = ?
2. $.15 + $.54 + $1.25 = ?
3. $9.69 − $1.25 = ?
4. Take $24.68 from $30.00.
5. Add $15.90 and $.87.
6. Take $.89 from $3.50.
7. Take $.05 from $10.00.
8. $5.95 minus $4.00 = ?
9. $124.50 plus $24.50 = ?
10. $115.75 − $85.49 = ?

Multiplying Amounts of Money



1. Jack worked 18 days on a farm. He earned $2.50 a day. How much did he earn?

When the farmer asked, "How much do I owe you?" Jack wrote this multiplication on a piece of paper.

JACK

$$\begin{array}{r} \$2.50 \\ \times 18 \\ \hline 2000 \\ 250 \\ \hline \$4500 \end{array}$$

Jack said, "It looks as if you owe me $4500, but that sounds too large." Check Jack's work. What had he forgotten to do?

2. How much should Jack get for his work?

3. When you multiply an amount containing dollars and cents, your answer must show dollars and cents. How should Jack place the decimal point in his product to show cents?

4. Copy and finish these examples. Remember the decimal point in the product.

$1.29	$.65	$8.37
×38	×84	×214
1032	260	3348
387	520	837
		4

▶ Copy. Multiply.

5.	7¢	9¢	12¢	15¢	25¢
	×6	×4	×8	×6	×3
6.	$7.38	$9.47	$5.92	$8.35	
	×3	×8	×5	×9	
7.	$4.74	$6.38	$2.71	$7.54	
	×84	×68	×45	×62	
8.	$3.27	$6.29	$9.18	$3.22	
	×283	×324	×657	×542	
9.	$8.43	$7.39	$3.47	$9.62	
	×628	×532	×176	×419	
10.	$0.86	$0.96	$0.89	$0.73	
	×527	×183	×892	×461	

Watching Zero in Multiplication

	Long Way		Short Way		CHECK
RUTH	324	JIM	324		760
	×760		×760		×324
	000		19440		3040
	1944		2268		1520
	2268		246,240		2280
	246,240				246,240

1. Ruth multiplied 324 by 760. Why did she write three zeros as her first partial product?

2. Jim showed her a shorter way to multiply 324 by 760. How many red zeros did he write? When he wrote his third partial product, how did he show that 0 was his first partial product and that 1944 was his second partial product?

▶ Use the short way. Multiply.

3.	743 ×320	691 ×540	856 ×630
4.	316 ×640	424 ×390	943 ×720
5.	386 ×840	575 ×610	837 ×250

6. Bob multiplied 726 by 309. His work is shown at the bottom of this page. How did he find his second partial product? How did he show his second partial product?

7. Ellen used a shorter way. How many zeros did she write for her second partial product? How did she show that 2178 was the third partial product?

▶ Copy. Multiply Bob's way. Then multiply again. Use Ellen's way.

8.	414 ×906	912 ×304	174 ×203
9.	837 ×108	729 ×405	294 ×705

■ **The right-hand figure of each partial product is written exactly under the multiplier figure used to find that partial product.**

	Long Way		Short Way		CHECK
BOB	726	ELLEN	726		309
	×309		×309		×726
	6534		6534		1854
	000		21780		618
	2178		224,334		2163
	224,334				224,334

Easy Rules About Annexing Zeros

1. Say these products quickly.

10×4 10×9 10×36

10×40 10×874 10×92

2. Give the rule that you used to find the products in example 1.

3. Study these multiplications. Then make up a rule for multiplying a number by 100.

$100 \times 3 = 300$

$100 \times 56 = 5600$

$100 \times 375 = 37500$

4. Use the rule you made and multiply each of these numbers by 100.

4 7 9 37 78 196 384

5. Study these multiplications. Then make up a rule for multiplying by 1000.

$1000 \times 4 = 4000$

$1000 \times 95 = 95000$

$1000 \times 635 = 635000$

Annexing a zero to a number means writing a zero after the number.

To multiply by 10, annex one zero to the number.

To multiply by 100, annex two zeros to the number.

To multiply by 1000, annex three zeros to the number.

■ **You can multiply quickly by 10, 100, or 1000 by annexing one, two, or three zeros to the number.**

6. Multiply each of these numbers by 1000. Write answers only.

5 9 19 45 372 860

7. Write the answers for these multiplications.

$$\begin{array}{r} 423 \\ \times 200 \end{array}$$

THINK: $2 \times 423 = 846$

$200 \times 423 = 84600$

$$\begin{array}{rrrrr} 714 & 285 & 241 & 954 & 752 \\ \times 200 & \times 500 & \times 400 & \times 600 & \times 300 \end{array}$$

▶ Copy. Find the answers to the number questions.

8.
$$\begin{array}{rrrr} 78 & 83 & & \\ 264 & 976 & & \\ +30 & +24 & +87 & +3604 \\ & +287 & +234 & +6039 \end{array}$$

9.
$$\begin{array}{rrrr} 83 & 230 & 3010 & 483 \\ -16 & -94 & -2693 & -395 \end{array}$$

10.
$$\begin{array}{rrrr} 4861 & 674 & 5203 & 84 \\ -84 & -7 & -8 & -6 \end{array}$$

11.
$$\begin{array}{rrrr} 23 & 451 & 678 & 89 \\ \times 8 & \times 9 & \times 14 & \times 64 \end{array}$$

12.
$$\begin{array}{rrr} \$3.62 & 809 & 942 \\ \times 40 & \times 32 & \times 806 \end{array}$$

Reviewing Problem Solving

The first thing to do when you have a problem to solve is to be sure you understand the problem.

- Read the problem carefully.
- Think: What does the problem ask me to find? What facts does the problem give?

The next thing is to decide what you must do with the numbers to get the right answer.

- To put equal groups together and find how many, you can add or multiply.
- To take one group from another group to compare the two groups, or to find how many are left, you must subtract.
- To put unequal groups together and find how many in all, you must add.

Think of these points as you solve the problems.

1. Father bought a new house. It cost $16,800. He paid $5500 down on the house. How much did he have left to pay?

2. Father will have to pay $85.00 a year for insurance on the house, $135.75 taxes, and $16.25 for the water service each year. What will be the total amount of these expenses?

3. He makes a payment of $75 each month on the balance that he owes on the house. How much will he pay in 12 months?

4. Mother bought some new furniture for Ruth's room. She paid $175.95 for a bedroom set, $95.00 for a rug, and $9.75 for a lamp. How much did she spend?

5. Mother sold some of her old furniture. She got $15 for a table, 75 cents for a chair, $35.00 for a stove, and $65.75 for a dining room set. How much did she get for what she sold?

6. The Giant Moving Company said it would cost $65 to move the family to their new home. The

Careful Moving Company said the cost would be $58.50. How much will the family save by hiring the less expensive company?

7. Ruth made some curtains. She used 6 yards of material to make one pair. How many yards did she use for 9 pairs?

8. If curtain material costs $.49 a yard, what will 54 yards cost?

9. Ruth's brother, Tom, wanted a typewriter for his new desk. He sold his electric train set for $45.50. He used this to make a down payment on a typewriter costing $89.95. How much was left to be paid on the typewriter?

No Pencils, Please!

10. The new house was 23 blocks from the old one. Tom rode 9 blocks with a friend. He walked the rest of the way. How many blocks did he walk?

11. Ruth made a blue and white bedspread. She bought 12 yards of material for the spread. If 8 yards of this were blue, how many yards were white?

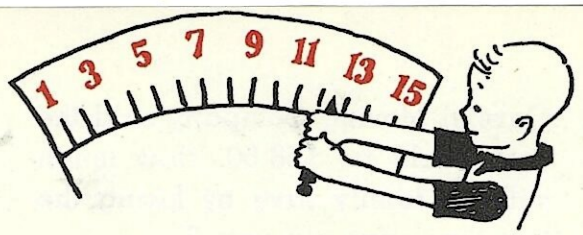
12. There were 23 windows in the new house. Tom washed 17 of them. Ruth washed the rest. How many windows did Ruth wash?

13. Tom cut the grass. He said it took 4 hours to finish. How many minutes was this?

14. Tom had to walk 11 blocks to get to school from his old house. The school is 17 blocks away from his new house. The distance to school now is how much greater than it was before?

15. Father rented half of the garage to a neighbor for $10 a month. How much rent did he get for the garage in 1 year, or 12 months?

16. Aunt Molly came to live at Tom and Ruth's new house. Aunt Molly paid $20 a week for her room and board. How much did she pay in 4 weeks?



How Well Have You Learned?

What do you think the pointer on the dial will show this time? Do the following work carefully and you will soon find out.

1. Show how the example $15 \times 40 = 600$ can be solved if you think of 15 as 10 and 5.

2. Give the rule for multiplying any whole number by 10. Begin, "To multiply any whole number by 10 . . ."

3. Give two examples showing how to multiply a whole number by 10 quickly.

4. Show on a number line that $3 \times 8 = 2$ tens and 4 ones.

5. Use addition to prove that seven 6's equal 42.

6. Write the multiplication combinations that you would find on the back of the basic products card for 21.

7. For which of these multiplications would you have to use partial products?

A.	B.	C.
49	325	531
$\times 23$	$\times 8$	$\times 734$

8. Estimate to the nearest dollar how much you could earn in a day if you worked 6 hours at \$.95 an hour.

9. What would be your first partial product if you exchanged the places of the multiplier and multiplicand in this example?

$$\begin{array}{r} 621 \\ \times 243 \\ \hline \end{array}$$

10. Write answers only for these multiplications:

$100 \times 524 = ?$ $\quad 1000 \times 53 = ?$

$100 \times 59 = ?$ $\quad 1000 \times 4 = ?$

11. Write the products.

9	6	8	7
$\times 8$	$\times 9$	$\times 7$	$\times 6$
5	9	8	7
$\times 8$	$\times 7$	$\times 8$	$\times 4$

Copy. Multiply

12.	48	84	76	69	87
	$\times 9$	$\times 3$	$\times 7$	$\times 75$	$\times 96$
13.	357	709	364	352	
	$\times 793$	$\times 4$	$\times 250$	$\times 500$	
14.	364	789	530	653	
	$\times 206$	$\times 68$	$\times 421$	$\times 748$	

15. Multiply \$35.85 by 463.

Help Yourself to Improve

1. Think of 24 as 20+4. Multiply 36 by 24. (52)

2. Write this addition as a multiplication question:

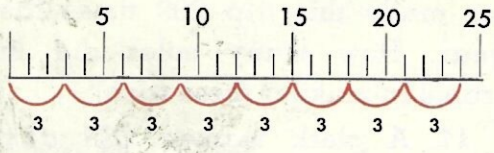
$$6+6+6+6+6+6+6=\square$$

(54)

3. Use dots. Show that 6×7 has the same answer as 7×6. (55)

4. Use a number line. Show that the factors $3\times5=15$ and that the factors $5\times3=15$ also. (56)

5. This number line shows a multiplication question and its answer. Write the multiplication fact in four different ways. (54)



6. If each bus carries 38 children to the school picnic, how many children will 8 buses carry? In this problem, which number tells the number of things in one of the equal groups? Which number tells how many equal groups there are? (54, 55)

7. Write ten basic multiplication facts having products larger than 25. (60)

8. How do you annex a zero? (73)

9. Annex zeros to find the products: (73)

1000×78	1000×955	10×56
100×2305	100×1000	10×104

10. Write four combinations that have 18 as their product. (57)

Copy. Multiply. If you have any wrong answers, study the page referred to at the end of the row.

11.	859 $\times7$	493 $\times5$	638 $\times9$	617 $\times7$	(63)
12.	68 $\times35$	59 $\times87$	837 $\times85$	693 $\times48$	(65)
13.	723 $\times413$	518 $\times524$	735 $\times618$		(68)
14.	307 $\times2$	509 $\times7$	103 $\times5$	604 $\times6$	(69)
15.	607 $\times24$	702 $\times53$	908 $\times57$	503 $\times89$	(69)
16.	\$.89 $\times52$	\$.36 $\times48$	\$.27 $\times65$		(71)
17.	\$1.75 $\times5$	\$3.56 $\times64$	\$4.57 $\times45$		(71)
18.	148 $\times420$	349 $\times150$	519 $\times206$		(72)
19.	524 $\times500$	861 $\times200$	392 $\times700$		(73)

Show That You Know

1. In a given year it was estimated that there were 61,480,000 motor vehicles in the United States. Write this number using words only.

2. A salesman says he travels about 550 miles each week in his car. At this rate how many miles will he travel in 48 weeks?

3. An apple grower packs 48 apples in a box. How many apples will he pack in 75 boxes?

4. A passenger plane travels at a speed of 308 miles an hour for 6 hours. How far does it travel in this time?

5. A farmer raised an average of 165 bushels of corn per acre. How many bushels will he get from 205 acres?

6. Mr. Jones figures that he gets about 16 miles per gallon of gas. How far can he drive if he uses 200 gallons?

7. Mrs. Brown bought a new refrigerator. She agreed to pay for it in 24 equal payments of $10.95 each. How much will she pay for it?

8. Mr. Smith bought a house costing $17,800. He made a payment of $5500 dollars at the time of purchase. How much did he have left to pay?

9. Mr. West hauled 3318 pounds of corn to the mill. He took a second load to the mill. This load weighed 2000 pounds. The third load that he hauled weighed 2240 pounds. How many pounds did the three loads together weigh?

10. St. Louis and Cincinnati are 339 miles apart. A railroad conductor made this trip 289 times last year. How many miles did he travel in making these trips?

11. A clerk worked 289 days last year. She sold $136 worth of dresses on an average each of these days. What was the total value of her dress sales?

12. A certain train travels an average of 78 miles an hour. How far will it travel in 20 hours?

13. A milkman delivers to 480 customers in a day. How many quarts of milk will he deliver in a day if each customer takes only 1 quart of milk? How many will he deliver on 6 trips at this rate?

Finding How Many Equal Groups

These children have 500 books to send to a school that wants to begin a library. They are packing 25 books in each box for mailing. How many boxes will they need?

Ted said, "We will need 20 boxes." Mary asked how he could tell.

Ted said, "There are four 25's in 100. We have 5 hundred books. The number of boxes we need is 4×5, or 20 boxes."

1. Divide each of these numbers by 25, using Ted's way.

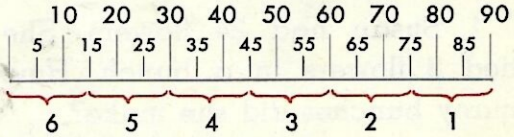
600 800 1000 900

"If we had only 90 books, your way would not work," Mary said. "It would not work if we put less or more than 25 books in a box, either."

2. Explain what Mary meant.

3. How many boxes will the children need if they have 90 books and put 15 books in a box.

Mary found the answer by dividing. She could not be sure that her answer was right. She used a number line to see if her answer was correct. Explain her work.



4. The second week the children collected 60 books. How many boxes did they need if they packed these books 15 in a box? Find the answer by dividing. If you cannot divide 60 by 15, use the number line.

5. Use subtraction to show that your answer for problem 4 is right.

6. Last week the children got 50 large books. Only 10 of these could be packed in a box. How many boxes were needed? Divide to find your answer. Then subtract to see if your answer is correct.

Answering Number Questions by Dividing

Each of these problems tells you the total number, or how many there are in all. Each problem also tells you how many there are in one of the equal groups. The problem asks you to find how many equal groups you can get from the total number.

Read the problem. Read the number that tells how many in all. Read the number that tells how many in one of the equal groups. Read the number question that the problem asks.

1. Susan had 24 flowers. She tied 8 flowers in a bunch. How many bunches did she make?

2. Earl pulled 48 carrots from his garden. He tied 6 carrots in a bunch. How many bunches did the 48 carrots make?

3. Bob mows 20 lawns each week. He cuts 4 lawns in a day. In how many days can he cut all the lawns?

4. Mary writes 6 spelling words in a column. How many columns will she have for 42 words?

5. Ann baked 28 cookies. She wanted to put 7 cookies on each plate. How many plates will she need?

6. Joan had a ribbon that was 36 feet long. If she cut it into 9-foot pieces, how many pieces were there?

7. Jane works 8 examples on one sheet of paper. How many sheets will she need to work 32 examples?

8. Mother baked 28 cookies. She wants to give 4 cookies to each boy. Will she have enough cookies if there are seven boys?

9. Work problems 1-8. Find your answers by dividing. Use the number line if you need help with your division.

10. Work problems 1-8 again. This time find the answers by subtracting. See whether you get the same answers as you did when you divided.

Read and answer division number questions 11 through 14. Then tell which problem from 1 through 8 asks each of these division questions.

11. How many 6's equal 48?

12. How many 8's equal 32?

13. How many 6's equal 42?

14. How many 8's equal 24?

15. What division question does problem 8 ask?

16. When Earl used division to solve problem 2 on page 80, he wrote his division question this way. How would you read what he has written?

EARL

$6\overline{)48}$

Use dots and find the answer to his question.

17. Which problem on page 80 does this dot drawing solve?

18. See how Ann showed the division for problem 1 on page 80.

How do you read the division fact that this division shows?

ANN

$$8\overline{)24}\quad \begin{array}{r} 3 \\ 24 \\ \hline 0 \end{array}$$

Why did Ann write the 3 in her answer above the 4 in 24?

19. If Ann had written 3 above the 2 in 24, the 3 would have been in tens place. Make a dot drawing to show that Ann's answer is 3 ones and belongs in ones place.

20. Ann has written 24 twice in her division. How did she find the second 24?

21. What does the 0 in Ann's division show?

The Names, or Terms, for Parts of Division

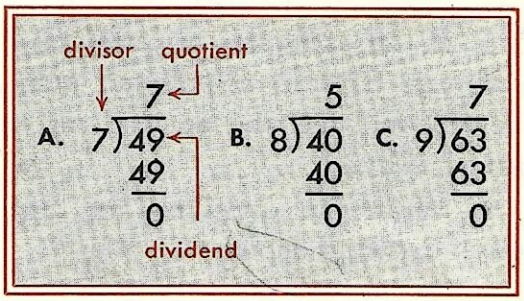
1. In which example at the right is the divisor an even number?

2. Which examples have a quotient less than 10?

3. Which two examples have odd numbers as dividends?

4. Tell which term is missing in the following examples. Then give the missing number.

$$\begin{array}{r} \square \\ 4\overline{)48} \\ 48 \\ \hline 0 \end{array} \qquad \begin{array}{r} 9 \\ \square\overline{)27} \\ 27 \\ \hline 0 \end{array} \qquad \begin{array}{r} 7 \\ 3\overline{)\square} \\ 21 \\ \hline 0 \end{array}$$

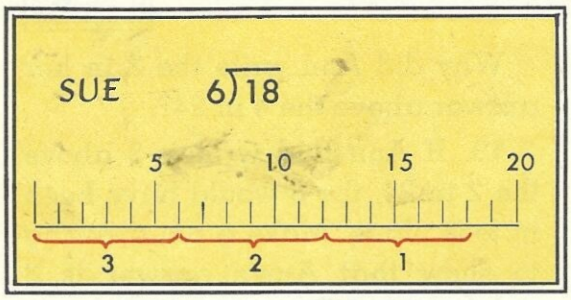


5. Write an example that has a quotient of 8 and a divisor of 5.

6. Write an example that has 3 as a divisor and 4 as the quotient.

Division Facts and Important Division Questions

Sue wrote this division question. Then she used a number line to answer it.



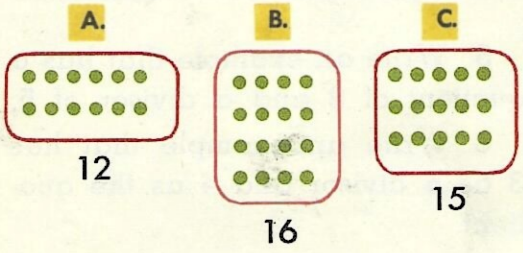
1. Read Sue's division question. Then explain what she showed on the number line.

2. The division fact shown on Sue's number line is a basic division fact. Give this fact.

■ **The basic division facts are the facts in which the divisor and the quotient are one-figure numbers.**

3. If the examples in question 4 on page 81 had no missing numbers, would they be basic division facts? Why?

4. Write the division fact that each drawing shows.



5. Answer these division questions by using a number line.

2)18 3)15 5)25 9)36 9)54

6. Answer these division questions by using subtraction.

9)27 5)45 6)30 8)32 4)28

7. Write the answers to these division questions as rapidly as you can read them.

8)72 6)48 6)36 3)27 9)72

8. Which is the fastest way to answer a division question?

▶ Use folded paper. Write the quotients for these basic division questions. Keep your paper.

BOB				
	9	5	9	8
9.	3)27	4)20	4)36	6)48
10.	5)25	5)45	6)18	7)28
11.	5)40	2)18	6)30	6)12
12.	2)6	7)56	8)32	3)21
13.	6)24	3)9	2)16	6)36
14.	5)10	3)12	3)15	4)8
15.	4)16	7)14	5)35	9)81
16.	7)49	7)42	6)54	8)64

Will You Add, Subtract, Multiply, or Divide?

Study page 74 again.

Will you add, subtract, multiply, or divide to find the answer:

1. If the problem asks you to put unequal groups of things together?
2. If the problem asks you to take one group of things from another group of things?
3. If the problem asks you to put several equal groups of things together?
4. If the problem asks you to find how many equal groups there are in a larger group?

Read each problem carefully. Decide what you must do to find the answer. Then solve the problem.

1. Don had a spelling test. There were 25 words in the test. Don got 19 words right. How many did he get wrong?

2. Ellen has 24 glasses to arrange on a tray. If she puts 4 glasses in a row, how many rows will there be?

3. Jim's father sold 500 bushels of corn at $1.18 a bushel. What was the amount of this sale?

4. A farmer raised 5890 bushels of corn last year. This year he raised 6700 bushels of corn. How many more bushels did he raise this year?

5. Tom picked 72 tomatoes. He put 8 tomatoes in a basket. How many baskets did he need for all of the tomatoes?

6. Mary tied 54 carrots in bunches of 6 carrots each. How many bunches did this make?

7. Mr. Brown took 28 cows to market. He took 4 cows on each trip. How many trips did he make to get all the cows to market?

8. Jim was selling cider at a roadside stand. He wanted to count how many jugs of cider he had left. He saw there were 12 jugs in a row and there were 5 rows. How many jugs were there in all?

9. Do the examples on page 82, rows 9-16, again. Compare the score you make this time with the score you made before. Have you improved?

Use these steps to study facts you missed.

1. Look at the fact. Read it.
2. Close your eyes. Try to see the fact clearly.
3. Say the fact. Write it.
4. Check. Did you write the fact correctly?

Related Multiplication and Division Facts

JOAN

Four Related Basic Facts

Multiplication Pair		Division Pair	
$\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$	$\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$	$3\overline{)18}$	$6\overline{)18}$

Joan knows the basic division facts very well. She says the basic multiplication facts help her. She explained that she thinks of a basic multiplication fact in this way:

$$\begin{array}{r} 3 \text{ factor} \\ \times 6 \text{ factor} \\ \hline 18 \text{ product or multiple} \end{array}$$

and

$$\begin{array}{r} 6 \text{ factor} \\ \times 3 \text{ factor} \\ \hline 18 \text{ product or multiple} \end{array}$$

She said that **factors** are not new. Pages 60 and 61 will help you review them. But the name **multiple** is new.

■ **In a basic multiplication fact the product is a multiple of each of the two factors. That is, the multiple will contain either of the factors an exact number of times.**

In the fact $3 \times 6 = 18$, 18 is the multiple of 3 because 18 contains 3 exactly 6 times.

1. Draw dots and show that 18 is a multiple of 3.

2. Draw a dot picture that will show that 18 is a multiple of 6.

Joan said you can use two factors and their product, as 3, 6, and 18, to make a pair of division facts:

$3\overline{)18}$	$6\overline{)18}$

She said, "In the pair of division facts, the multiple 18 will be the dividend. When the divisor is 3, the quotient will be the other factor, or 6. When the divisor is 6, the quotient will be the other factor, or 3."

▶ Copy. Write the missing factor in each fact. The Multiplication

Board on page 60 will help you, if you cannot recall the factors.

3. $4 \times \square = 20$ $\quad \square \times 4 = 20$ $\quad \square)\overline{20}$ $\quad 4)\overline{20}$

4. $\square \times 6 = 30$ $\quad 6 \times \square = 30$ $\quad 6)\overline{30}$ $\quad \square)\overline{30}$

5. $8 \times \square = 56$ $\quad \square \times 8 = 56$ $\quad \square)\overline{56}$ $\quad 8)\overline{56}$

6. For each set of numbers write four related basic multiplication and division facts.

9, 8, 72 $\quad$ 6, 7, 42 $\quad$ 7, 9, 63
8, 6, 48 $\quad$ 9, 6, 54 $\quad$ 8, 4, 32

7. What multiplication fact helps you to know that the quotient is 8 when you divide 72 by 9?

▶ Copy each division question. Write after it the multiplication fact that will help you answer the division question. Then write the answer to the division question.

▶ Copy each division question again and write the quotient. Beside the example write the other division fact that is related to it.

8. $7)\overline{42}$ $\quad 6)\overline{48}$ $\quad 3)\overline{21}$ $\quad 8)\overline{24}$

9. $4)\overline{36}$ $\quad 7)\overline{28}$ $\quad 6)\overline{24}$ $\quad 7)\overline{56}$

10. $5)\overline{35}$ $\quad 8)\overline{40}$ $\quad 6)\overline{54}$ $\quad 4)\overline{32}$

11. $4)\overline{24}$ $\quad 7)\overline{14}$ $\quad 9)\overline{18}$ $\quad 9)\overline{36}$

12. $2)\overline{12}$ $\quad 4)\overline{8}$ $\quad 4)\overline{12}$ $\quad 5)\overline{20}$

How Well Do You Remember?

1. How many ones are there in the number 615? How many tens? How many hundreds?

2. Use words. Write the number that means 21 thousands, 4 hundreds, no tens, 8 ones.

3. Write in figures: twelve thousand, forty-two.

4. Write in figures the number shown on this place-value frame.

thousands	hundreds	tens	ones
///		//	////

5. Write in figures the number that is 1 more than 9999.

6. Write in figures the number that is 1 less than 2000.

7. Write the odd numbers from 21 to 35.

8. Which of these numbers is not an even number?

142 $\quad$ 5928 $\quad$ 4902 $\quad$ 631 $\quad$ 5326

9. Subtract 598 from 2609.

10. What is the difference between \$.45 and \$5.00?

Practicing to Improve Your Division

You can make your division easy if you practice **multiple counting.** That is, you think the factors, and say the multiple. To count by 6's to 54, do this:

THINK:		SAY:
1	× 6	6
2	× 6	12
3	× 6	18
4	× 6	24
5	× 6	30
6	× 6	36
7	× 6	42
8	× 6	48
9	× 6	54

1. Give the multiples of 8. Begin with 2×8. End with 9×8.

2. Give the multiples of 9. Begin with 2×9. End with 9×9.

3. Work with a partner. While one partner says the multiples of a given number, the other partner will watch the chart for multiple counting.

Read the chart in this way. To read the multiples of 7, find the column which has 7 for its first number. Read down this column. Or you can find the row that has 7 for its first number. Read across this row and you will be reading the multiples of 7.

CHART FOR MULTIPLE COUNTING

1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72
9	18	27	36	45	54	63	72	81

4. How would you find the multiples of 5 on the chart? Of 9?

5. Which of these numbers is not a multiple of 8?

24 32 64 20 56 72

6. Which of these numbers are multiples of 6?

12 36 42 15 18 48

7. Give the numbers that belong in place of the question marks.

7, 14, 21, ?, ?, ?, ?, ?, ?, ?

8. Give the numbers that have been omitted.

3, ?, ?, 12, ?, ?, 21, 24, ?

9. Make a dot drawing to show that 27 is not a multiple of 5.

10. Make a dot drawing to show that 56 is a multiple of 7.

▶ Use folded paper. Write the answers.

11. $9\overline{)27}$ $5\overline{)20}$ $9\overline{)36}$ $8\overline{)48}$

12. $5\overline{)25}$ $9\overline{)45}$ $3\overline{)18}$ $4\overline{)28}$

13. $8\overline{)40}$ $9\overline{)18}$ $5\overline{)30}$ $2\overline{)12}$

14. $3\overline{)6}$ $8\overline{)56}$ $4\overline{)32}$ $7\overline{)21}$

15. $4\overline{)24}$ $3\overline{)9}$ $8\overline{)16}$ $6\overline{)36}$

16. $2\overline{)10}$ $4\overline{)12}$ $5\overline{)15}$ $2\overline{)8}$

17. $4\overline{)16}$ $2\overline{)14}$ $7\overline{)35}$ $9\overline{)81}$

18. $7\overline{)49}$ $6\overline{)42}$ $9\overline{)54}$ $8\overline{)64}$

19. Use page 327 to check your answers. Compare these answers with the answers to the division questions in rows 9-16 on page 82. What do you notice? Explain this.

20. Work with a partner. While one partner watches, the other will say the quotients to the division questions in rows 11-18 as fast as he can. Study the facts you cannot give quickly.

21. Use the division questions in rows 9-16 on page 82. One partner will point to any row he wishes. The other partner will give the quotients as rapidly as he can.

Mixed Review

▶ Copy. Find the answers. Watch the signs carefully.

1. $\begin{array}{r} 65 \\ \times 9 \\ \hline \end{array}$ $\begin{array}{r} 850 \\ -\,49 \\ \hline \end{array}$ $\begin{array}{r} 5396 \\ \times 7 \\ \hline \end{array}$ $\begin{array}{r} \$25.68 \\ +3.68 \\ \hline \end{array}$

2. $8\overline{)72}$ $6\overline{)54}$ $\begin{array}{r} 5206 \\ \times 80 \\ \hline \end{array}$ $\begin{array}{r} 7000 \\ -\,4 \\ \hline \end{array}$

3. $\begin{array}{r} 305 \\ 72 \\ 689 \\ 427 \\ +9 \\ \hline \end{array}$ $\begin{array}{r} 6894 \\ 504 \\ 5279 \\ +5823 \\ \hline \end{array}$ $\begin{array}{r} 158 \\ 285 \\ 903 \\ 646 \\ +987 \\ \hline \end{array}$ $\begin{array}{r} \$1.52 \\ .89 \\ 5.64 \\ .09 \\ +\ .50 \\ \hline \end{array}$

4. $\begin{array}{r} 5938 \\ -3969 \\ \hline \end{array}$ $\begin{array}{r} 6850 \\ \times 508 \\ \hline \end{array}$ $\begin{array}{r} 7493 \\ -5000 \\ \hline \end{array}$ $\begin{array}{r} \$6.90 \\ -.45 \\ \hline \end{array}$

5. $\begin{array}{r} \$8.95 \\ \times 35 \\ \hline \end{array}$ $\begin{array}{r} 5986 \\ +1050 \\ \hline \end{array}$ $\begin{array}{r} 894 \\ \times 365 \\ \hline \end{array}$ $\begin{array}{r} 589 \\ \times 576 \\ \hline \end{array}$

No Pencils, Please!

1. In the division 42 divided by 6 equals 7, which number is the dividend?

2. In the addition $35+3=38$, which numbers are the addends?

3. In the subtraction $9-4=5$, which number is the difference?

4. The product of two numbers is 63. One of the factors is 9. What is the other factor?

5. If the dividend is 54 and the quotient is 6, what is the divisor?

Thinking Back to the Nearest Multiple

1. Some boys were playing at Jim's house. For a game each boy needed 9 bottle caps. Jim had 38 caps. How many boys could play the game at one time? Jim found the answer by thinking, "Four 9's are 36. 38 is 2 more than 36. There will be 4 groups of 9 caps and 2 caps left over. Four boys can play at one time."

Bob asked Jim why he thought back to 36, when he was dividing 38 bottle caps by 9.

Jim explained that he thought back to the nearest number that would contain 9 an equal number of times. That is, Jim thought back to the nearest multiple of 9, or 36. Then he thought, "38 is 2 more than 36." He knew that there would be 2 left over after dividing. The answer would be 4 with a remainder of 2.

JIM

$$9\overline{)38}\quad 4,\ r\ 2$$
$$36$$
$$2 \text{ remainder}$$

2. Jim wrote his division for Bob.

What does **r** after the quotient mean? What did Jim do to find the remainder of 2?

Try to answer questions 3-6 by thinking back to the nearest multiple of 6. Tell how many 6's equal the multiple and how many are remaining after you divide.

3. How many 6's + ☐ = 27?
4. How many 6's + ☐ = 43?
5. How many 6's + ☐ = 50?
6. How many 6's + ☐ = 31?

7. Make a dot drawing. Show what the remainder is when you answer "How many 6's + ☐ = 28?"

8. What numbers smaller than 40 can be divided evenly by 4?

9. Write the multiples for 3 that are smaller than 30.

10. If you were dividing 27 by 4, would you think of the multiple 20, or 24? Why?

11. Of what multiple would you think if you were dividing 18 by 4?

12. Susan wrote this example.

SUSAN

$$8\overline{)38}\quad 4,\ r\ 6$$
$$32$$
$$6 \text{ remainder}$$

She said she thought back to the nearest multiple of 8. What number was this? How did Susan find the left-over part, or the remainder?

13. Write the multiples of 9 through 81. Then divide each of the following numbers by 9. Before dividing, think back to the nearest multiple of 9.

32 51 44 10 35 87

14. Write the multiple that you would use for each division.

$6\overline{)44}$ $8\overline{)27}$ $5\overline{)49}$ $9\overline{)75}$

$4\overline{)19}$ $7\overline{)58}$ $9\overline{)42}$ $8\overline{)69}$

15. Copy and divide. Label the left-over part, or remainder, with an **r**. Think back to the nearest multiple of the divisor. Your remainder will be the difference between this multiple and your dividend.

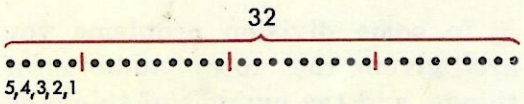
$9\overline{)21}$ $7\overline{)30}$ $5\overline{)28}$ $3\overline{)25}$

$4\overline{)37}$ $6\overline{)39}$ $2\overline{)15}$ $8\overline{)36}$

16. What is the remainder in these division questions?

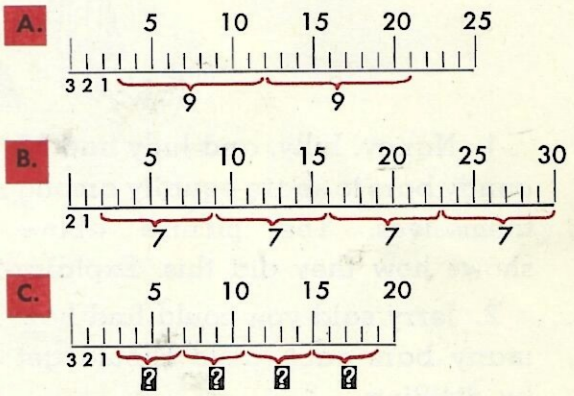
$5\overline{)32}$ $7\overline{)32}$ $9\overline{)32}$ $6\overline{)32}$

17. Write the division that this dot drawing shows.



18. Make a dot drawing to show the division $5\overline{)28}$.

19. Each of these number lines shows a division example that you can find on this page. Find and read these examples.



No Pencils, Please!

1. Candy bars cost 6¢ each. How many bars can you buy with 50¢? How many cents will you have left over?

2. Sue uses 7 yards of ribbon to make a fancy bow. She has 60 yards of ribbon. How many bows can she make? How many yards of ribbon will she have left over?

3. Jack had a board that was 11 feet long. He cut as many 2-foot boards from it as he could. How many 2-foot boards did he cut? How long was the piece of board that was left over?

4. Ann has 48 feet of shelf paper. How many 5-foot shelves can she cover with this paper? How many feet of paper will be left over?

A Different Kind of Division Question

1. Nancy, Billy, and Judy had 12 candy bars to share equally among themselves. The picture above shows how they did this. Explain.

2. Jerry said you could find how many bars each child should get by dividing.

JERRY

$$3\overline{)12}\quad 4$$

He drew dots to show that when you divide 12 things into 3 equal groups, there are 4 things in each group.

12

1 group	1 group	1 group
● ● ● ●	● ● ● ●	● ● ● ●

3. Draw dots and show how many candy bars each child would have received if there had been only Nancy and Billy.

4. Draw dots and show how many bars each child would have received if Nancy, Billy, Judy, and Jerry had shared the 12 bars.

5. Use figures only. Show how the answer to problem 4 can be found.

6. Mary made 18 sandwiches. She divided them equally among 6 children. What was each child's share of the sandwiches?

7. Four boys divided 36 apples equally among themselves. How many apples did each boy get?

8. Helen made 36 cupcakes for a Girl Scout meeting. There were 8 girls at the meeting. How many cakes did each girl get, if all got the same number of cakes? How many cakes were left over for the leader?

9. If you divide 81 sheets of paper into 9 equal stacks, how many sheets will there be in each stack?

■ **In some division problems you are given the total number of things, and the number of things in one of the equal groups. You are asked to find how many equal groups in the total number of things** **(page 80).**

■ **In other division problems you are given the total number of things, and the number of equal groups. You are asked to find how many things in one of the equal groups.**

Read the following problems. Tell whether you are to find how many equal groups, or how many in one equal group.

10. Jerry reads 9 pages of his book each day. In how many days will he read 81 pages?

11. Tom uses 4 lunch tickets a day. At that rate, how long will 32 lunch tickets last?

12. Jim has 48 pictures to paste in his scrapbook. He wants to paste 8 pictures on a page. How many pages will he need to do this?

13. Mary has enough film to take 36 pictures. If she takes 6 pictures a day, how many days will the film last?

14. Ann packed 72 pieces of candy in a box. If she put the candy in 9 equal rows, how many pieces were there in each row?

15. Jim has a board that is 12 feet long. If he cuts it into 6 equal pieces, how many feet long will each piece be?

16. Mary stacked 27 books in 3 equal stacks. How many books did she put in each stack?

17. Sue used 18 apples to bake 3 pies. If she put the same number of apples in each pie, how many apples would she peel for one pie?

18. Dan is using 4 nails to fasten the cover on one box. How many boxes can he nail shut if he has 32 nails?

19. Each table in the school lunchroom seats 8 children. How many tables will it take to seat 40 children?

No Pencils, Please!

1. Say the quotients.

$9\overline{)72}$ $6\overline{)42}$ $4\overline{)28}$ $9\overline{)27}$ $7\overline{)63}$

$5\overline{)35}$ $7\overline{)49}$ $8\overline{)64}$ $5\overline{)40}$ $9\overline{)45}$

2. Think the division. Say only the remainder.

$4\overline{)19}$ $5\overline{)28}$ $9\overline{)64}$ $6\overline{)45}$ $8\overline{)42}$

$3\overline{)14}$ $7\overline{)52}$ $6\overline{)32}$ $9\overline{)48}$ $7\overline{)65}$

3. For each pair of multiplication facts give two related division facts.

7	3	9	8	6	7
×3	×7	×8	×9	×7	×6
21	21	72	72	42	42

4. Give a pair of multiplication facts and a pair of division facts using: 6, 9, 54; 7, 8, 56; 9, 7, 63; 7, 5, 35.

BETTY

$4\overline{)48}$ =

4 ones $\overline{)}$ 4 tens 8 ones = 1 ten 2 ones = 12

TOM

$$4\overline{)48}\quad \begin{array}{r} 12 \\ 40 \\ \hline 8 \\ 8 \\ \hline 0 \end{array}$$

JACK $48 = 40 + 8$

$4\overline{)40}$ = 10 $\quad 4\overline{)8}$ = 2

$10 + 2 = 12$

Dividing Larger Numbers

1. Tom's father is going to build 4 pens for his sheep. If he has 48 sheep, how many sheep will there be in each pen?

Who found the answer in the best way, Betty, Tom, or Jack?

2. What does the 4 in 48 mean? How did Betty show the value of this 4 in her work?

3. In what ways are Tom's and Jack's work alike?

4. Which figure in Tom's quotient is in tens place? Why did he write it there?

▶ Copy. Divide as Tom did.

5. $3\overline{)63}$ $2\overline{)86}$ $4\overline{)44}$ $3\overline{)96}$

6. $2\overline{)42}$ $4\overline{)84}$ $3\overline{)36}$ $3\overline{)39}$

7. $3\overline{)69}$ $2\overline{)28}$ $5\overline{)55}$ $2\overline{)86}$

8. Nancy and Don gathered 75 pounds of wild rice. They wanted to pack the rice in bags each holding 5 pounds. How many bags did they need?

Explain Nancy's division. Where did she get the 20 ones that she put with the 5 ones?

NANCY

$5\overline{)75}$ = 1 ten 5 ones = 15

5 tens (20) 5 ones

9. When Don divided $5\overline{)75}$, he first thought $5\overline{)7}$. How did he show that he was really dividing $5\overline{)70}$, and that his quotient figure was 10 and not 1?

DON

$$5\overline{)75}\quad \begin{array}{r} 1? \\ 50 \\ \hline 25 \\ ?? \end{array}$$

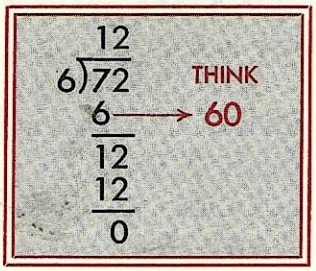
■ **When only a part of a dividend is used in finding a quotient figure, the part of the dividend is called a partial dividend.**

10. What is the first partial dividend when you divide $6\overline{)72}$?

11. When you think $6\overline{)7}$ in example 10, what quotient figure will

you write? Where will you write it? Why?

Many people write examples of this kind in a short way, like this.

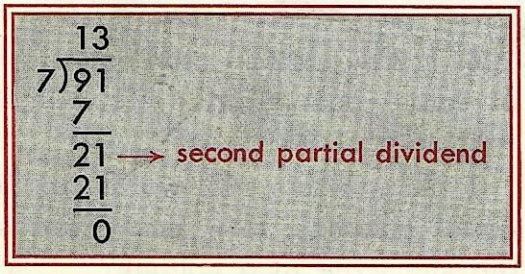


They write the 6 of 60 in tens place. The zero need not be written because it is understood that 6 in tens place means 60.

12. Write Tom's division at the top of page 92 in the short way.

13. Use the short way and finish Don's division in column 2, page 92.

14. In the division $7\overline{)91}$ the first partial dividend is 9. You think: $7\overline{)9}$. The second partial dividend is 21. You think: $7\overline{)21}$.



15. What is the second partial dividend in example 10, on page 92?

16. What is the second partial dividend in Don's division on page 92?

▶ Copy. Divide. Show all the work.

17. $5\overline{)95}$ $4\overline{)56}$ $7\overline{)84}$ $3\overline{)75}$

18. $8\overline{)96}$ $6\overline{)84}$ $7\overline{)98}$ $5\overline{)65}$

19. $4\overline{)92}$ $6\overline{)78}$ $2\overline{)74}$ $4\overline{)68}$

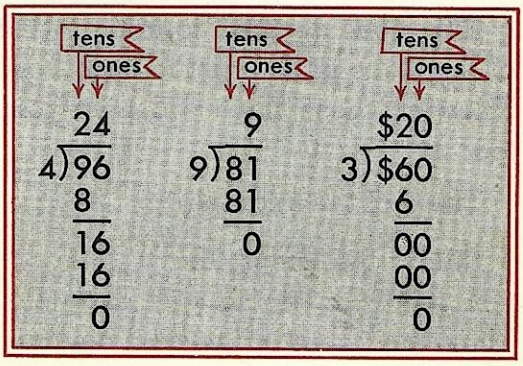
20. $2\overline{)52}$ $3\overline{)72}$ $5\overline{)85}$ $6\overline{)96}$

21. Find the quotients in the following examples. Use dot drawings to show that the quotient figure means ones and must be written in ones place.

$6\overline{)24}$ $3\overline{)21}$ $7\overline{)14}$ $5\overline{)10}$

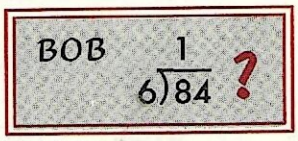
■ **In division, if the quotient figure means tens, write the figure in tens place in the quotient.**

■ **If the quotient figure means ones, write it in ones place in the quotient.**



Thinking of Steps Used in Division

Bob was working this example. He could not remember what to do next.



Copy Bob's work on your paper. Then answer these questions about the steps he should take in doing this division.

1. What multiple should he use in thinking how many 6's equal 8?

2. How can he find how many are left over after he has divided the 8 into 6's?

3. What will be Bob's second partial dividend? From where will he get the second figure of this dividend?

4. What should Bob's second quotient figure be?

5. Finish Bob's example. Think of the steps you take as you do this.

The class decided to make a list of the steps in division to help Bob. Knowing these steps will help you, too.

Think of the example: $4\overline{)96}$

Study the steps that you follow in doing this example. They are given in the next column.

STEP 1: Divide 9 by 4. The multiple you think of is 8. The quotient figure is 2.

STEP 2: Multiply the divisor 4 by the quotient figure 2. Write the product under 9.

STEP 3: Subtract 8 from 9. Write the remainder under 8.

STEP 4: Bring down the next dividend figure, which is 6. Write it beside the remainder to make 16. Repeat the first three steps with 16 as the dividend.

$$\begin{array}{r} 2 \\ 4\overline{)96} \end{array} \qquad \begin{array}{r} 2 \\ 4\overline{)96} \\ 8 \end{array} \qquad \begin{array}{r} 2 \\ 4\overline{)96} \\ 8 \\ \hline 1 \end{array} \qquad \begin{array}{r} 2 \\ 4\overline{)96} \\ 8 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 24 \\ 4\overline{)96} \\ 8 \\ \hline 16 \end{array} \qquad \begin{array}{r} 24 \\ 4\overline{)96} \\ 8 \\ \hline 16 \\ 16 \end{array} \qquad \begin{array}{r} 24 \\ 4\overline{)96} \\ 8 \\ \hline 16 \\ 16 \\ \hline 0 \end{array}$$

6. If 8 pupils can sit in each row of seats, how many rows will it take to seat 96 pupils?

7. Ann wrote 45 words in 3 equal columns. How many words did she write in a column?

8. How many bags can you fill if you put 6 cakes in each bag and you have 72 cakes?

Taking Stock — Test 4

Copy. Find the answers. Your teacher will tell you when to begin and when to stop.

PART I ADDITION

1.	74	23	64	56	31
	+8	+9	+5	+6	+9
2.	36	47	17	10	26
	+53	+19	+34	+64	+35
3.	12	8	$2.03	$.23	
	33	36	9.46	.04	
	74	42	.82	.71	
	+18	+4	+5.15	+.56	

PART II SUBTRACTION

4.	34	186	232	713
	−26	−94	−56	−422
5.	2072	$23.04	$200.00	
	−1846	−8.27	−83.49	
6.	6000	3002	4062	
	−84	−846	−2743	

PART III MULTIPLICATION

7.	846	329	369	402	
	×6	×8	×190	×239	
8.	56	94	83	90	47
	×44	×10	×27	×30	×53

PART IV DIVISION

9.	$6\overline{)54}$	$4\overline{)96}$	$3\overline{)78}$	$5\overline{)35}$
10.	$4\overline{)52}$	$6\overline{)72}$	$5\overline{)65}$	$4\overline{)76}$
11.	$4\overline{)60}$	$3\overline{)51}$	$7\overline{)49}$	$5\overline{)80}$
12.	$5\overline{)95}$	$4\overline{)92}$	$3\overline{)72}$	

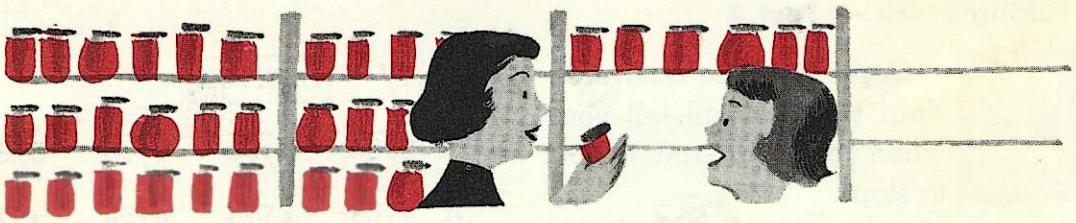
Mark the answers that you got wrong. Give yourself one point for each correct answer.

Record this score on your "Taking Stock" graph in your notebook. Shade, or color, as many places in the column for Test 4 as equal your score on this test.

Does your graph show that your work is getting stronger? On which test did you do best? Study any of the examples that gave you trouble.

Division Practice

1.	$4\overline{)23}$	$7\overline{)29}$	$8\overline{)68}$	$5\overline{)48}$
2.	$3\overline{)20}$	$9\overline{)39}$	$5\overline{)36}$	$6\overline{)29}$
3.	$8\overline{)76}$	$9\overline{)75}$	$4\overline{)30}$	$7\overline{)52}$
4.	$6\overline{)34}$	$5\overline{)28}$	$4\overline{)18}$	$9\overline{)47}$
5.	$8\overline{)59}$	$9\overline{)68}$	$3\overline{)29}$	$7\overline{)19}$
6.	$5\overline{)44}$	$7\overline{)36}$	$8\overline{)27}$	$9\overline{)21}$



Learning More About Remainders in Division

1. Mother made 75 glasses of jelly. She was putting them on a shelf. She put 6 glasses in each row. Betty said, "May I give Grandmother the glasses you have left over when all the rows are equal? I think I will have 3 glasses to give her."

Look at the picture above. How could Betty tell there would be 3 glasses left over?

2. If Betty had not had the glasses to count, she could have divided like this.

BETTY

$$\begin{array}{r} 12,\ r\ 3 \\ 6\overline{)75} \\ \underline{6} \\ 15 \\ \underline{12} \\ 3 \end{array}$$ remainder

How many equal rows are there? How many glasses are left over?

3. If Mother had put 3 glasses in a row, how many equal rows could she have made? How many glasses would she have left over?

4. If 4 glasses were put in a row, how many equal rows would there be? How many glasses would be left over? Explain Don's work.

DON

$$\begin{array}{r} 18,\ r\ 3 \\ 4\overline{)75} \\ \underline{4} \\ 35 \\ \underline{32} \\ 3 \end{array}$$ remainder

5. Here is how Tom did his division for problem 4. Does his quotient show the right number of rows? What do you notice about his remainder? Was 28 the right multiple to use when he divided the second partial dividend by 4?

TOM

$$\begin{array}{r} 17,\ r\ 7 \\ 4\overline{)75} \\ \underline{4} \\ 35 \\ \underline{28} \\ 7 \end{array}$$ remainder

■ **In division the remainder should always be smaller than the divisor.**

6. If you find that your remainder is larger than your divisor, what should you do?

▶ Copy. Divide. Show all your work.

7.	$4\overline{)97}$	$5\overline{)68}$	$7\overline{)86}$	$3\overline{)74}$
8.	$6\overline{)85}$	$3\overline{)59}$	$2\overline{)71}$	$4\overline{)79}$
9.	$8\overline{)95}$	$4\overline{)57}$	$6\overline{)83}$	$3\overline{)49}$
10.	$5\overline{)84}$	$6\overline{)77}$	$4\overline{)65}$	$8\overline{)93}$
11.	$4\overline{)69}$	$5\overline{)89}$	$6\overline{)88}$	$3\overline{)85}$
12.	$5\overline{)87}$	$4\overline{)99}$	$6\overline{)91}$	$7\overline{)93}$

No Pencils, Please!

1. When 64 is divided by 2, what is the value of the first quotient figure?

2. When 72 is divided by 9, what is the value of the quotient figure?

3. What multiple would you think of if you were dividing $8\overline{)65}$?

4. When you divide $6\overline{)72}$, what part of the dividend is used in getting the first quotient figure?

5. What multiple would you think of if you were asked to divide 23 by 4?

6. There is a mistake in each of the following divisions. Can you tell what the mistake is?

A. $6\overline{)63}$ → 1, r 3; 6; 3 ✗

B. $9\overline{)90}$ → 1; 9; 0 ✗

C. $4\overline{)69}$ → 16, r 5; 4; 29; 24; 5 ✗

D. $6\overline{)36}$ → 6; 36; 0 ✗

Remember Zeros in Multiplication

▶ Multiply. Check by going over your multiplication.

1.	328 × 540	624 × 120	690 × 415	609 × 326
2.	600 × 200	800 × 150	307 × 503	408 × 650
3.	\$9.00 × 144	\$5.95 × 200	\$8.05 × 105	\$1.50 × 350
4.	\$1.39 × 500	\$8.00 × 204	\$7.10 × 400	\$5.05 × 809
5.	407 × 203	450 × 600	750 × 450	600 × 163

Checking Answers in Division

1. Jane wanted to be sure that her quotient was correct. She began subtracting to check her answer.

JANE

$$4\overline{)64}\quad 16,\ 4,\ 24,\ 24,\ 0$$

CHECK

$$64 - 4 = 60,\quad 60 - 4 = 56,\quad 56 - 4 = 52$$

How many times would Jane have to subtract 4 from 64 to check her answer?

Jane did not finish her check. She said it would take too long.

2. Don said, "I know a shorter way to check your answer in division. Your answer says that sixteen 4's equal 64. If this is right, 16×4 should equal 64." Was Don right?

DON

$$4\overline{)64}\quad 16,\ 4,\ 24,\ 24,\ 0$$

CHECK

$$4 \times 16 = 64 \quad \text{or} \quad 16 \times 4 = 64$$

3. What two parts of Jane's division did Don use in his check?

▶ Copy. Divide. Check your quotients by multiplying.

4. $7\overline{)63}$ $6\overline{)90}$ $8\overline{)64}$ $4\overline{)76}$ $2\overline{)54}$

5. $5\overline{)85}$ $3\overline{)69}$ $9\overline{)81}$ $4\overline{)80}$ $3\overline{)48}$

6. $4\overline{)64}$ $3\overline{)87}$ $4\overline{)84}$ $5\overline{)65}$ $2\overline{)36}$

7. Bill divided 98 by 8, and found he had a remainder. What did he do with the left-over part in his multiplication check?

BILL

$$8\overline{)98}\quad 12,\ r\ 2;\ 8,\ 18,\ 16,\ 2$$

CHECK

$$12 \times 8 = 96,\quad 96 + 2 = 98$$

▶ Copy. Divide. Check using multiplication.

8. $5\overline{)97}$ $4\overline{)69}$ $8\overline{)65}$ $7\overline{)50}$ $8\overline{)99}$

9. $6\overline{)50}$ $7\overline{)96}$ $5\overline{)84}$ $4\overline{)95}$ $3\overline{)56}$

10. $7\overline{)95}$ $5\overline{)64}$ $6\overline{)93}$ $5\overline{)68}$ $3\overline{)85}$

11. $4\overline{)83}$ $5\overline{)69}$ $8\overline{)90}$ $6\overline{)75}$ $9\overline{)98}$

12. $6\overline{)39}$ $4\overline{)67}$ $7\overline{)86}$ $4\overline{)78}$ $8\overline{)41}$

13. $5\overline{)74}$ $3\overline{)37}$ $4\overline{)62}$ $8\overline{)69}$ $5\overline{)61}$

14. $3\overline{)47}$ $5\overline{)99}$ $8\overline{)95}$ $6\overline{)81}$ $3\overline{)55}$

Checking Your Answers

1. Do you remember the mark-out check in addition? If not, study page 5.

2. Copy. Add. Use the mark-out check to check your answers.

891	56	498	$ 90.12
96	295	602	473.50
108	374	86	5.75
+872	+593	+7	+396.00

3. Copy. Check your sums by adding in the opposite direction.

689	3895	$.98	$3.85
+407	+6275	+.47	+8.90

4. If you do not remember how to check your answers in subtraction, study page 32.

5. Copy. Find the differences. Check your answers.

509	650	$65.08	$8.00
−289	−649	−2.56	−2.55

6. Study page 66 if you do not remember how to check your products.

7. Copy. Multiply. Check your products.

74	807	219	$.89
×58	×164	×726	×75

8. Copy. Divide. Check your answers (page 98).

$8\overline{)92}$ $2\overline{)95}$ $7\overline{)58}$ $3\overline{)\$99}$

You have studied four processes this year — addition, subtraction, multiplication, and division. Which way is best to use in solving each problem here?

9. The speedometer read 23,864 miles when Mr. Brown began his trip. When the speedometer read 24,693 miles, how far had Mr. Brown traveled?

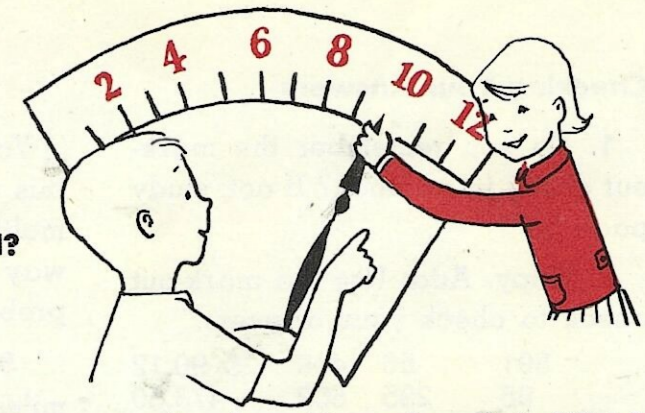
10. Jim earned $15.00 raking leaves last week. This week he earned $4.50. How much did he earn in all?

11. The 26 pupils in Tom's class helped to get ready for the school carnival. Each child got 2 free tickets for his work. How many free tickets will be needed for the whole group?

12. One teacher had 75 tickets for the carnival. This was exactly enough to give 5 tickets to each child in the class. How many children were there in the class?

13. Jim knew it was 160 miles from his home to the camp at Lakeside. While he was traveling from home to the camp, he saw a sign that said, "Lakeside—115 miles." How far was Jim from home?

How Well Have You Learned?



Use what you learned in this unit to do these exercises.

The pointer on the dial will show how well you remember the work.

1. What two division facts would be easy for you if you knew the multiplication fact $7 \times 9 = 63$?

2. Write the division fact that has 8 as the quotient and 48 as the dividend.

3. Show in three ways that the answer to $7\overline{)56}$ is 8.

4. What is the only multiple for 9 that is between the numbers 40 and 50?

5. In dividing 49 by 8, what multiple of 8 would you use?

6. What would be the first partial dividend in $6\overline{)93}$?

7. Check the division at the right in two ways.

$$\begin{array}{r} 19 \\ 4\overline{)76} \\ \underline{4} \\ 36 \\ \underline{36} \\ 0 \end{array}$$

Read problems 8 and 9. Which asks how many equal groups there will be? Which asks how many in one equal group?

8. Jerry put 65 tickets in packs of 5 tickets. How many packs did he have?

9. Don divided 90 tickets equally among 6 boys. How many tickets did each boy get?

10. Write the figure that is the divisor in the example at the right.

$$\begin{array}{r} 12 \\ ?\overline{)96} \\ \underline{?} \\ ?6 \\ \underline{16} \\ 0 \end{array}$$

11. What would be the second partial dividend in $4\overline{)58}$?

12. Find the mistake in the division at the right.

$$\begin{array}{r} 16, \text{r } 9 \\ 6\overline{)99} \\ \underline{6} \\ 39 \\ \underline{30} \\ 9 \end{array} \quad \times$$

Help Yourself to Improve

Do you know the work of this unit very well?

If the pointer shows that your work has not been the best, these questions can help you improve.

1. In a division example what is the answer called? What is the dividend? What is the divisor? (81)

2. Write two multiplication facts and two division facts for each of the following groups of numbers:

9, 8, 72 7, 8, 56 6, 9, 54
9, 7, 63 (84, 85)

3. What multiple of 7 is between 50 and 60? (84)

4. Which of these numbers is not a multiple of 8? (86)

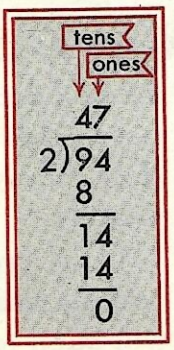
32 56 72 41 64

5. Give the multiples of 4. Begin with 8 and end with 48. (86)

6. Make a dot drawing to show how many are left over when you divide 29 by 4. (89)

7. On a number line show how many are left over when you divide 24 by 9. (89)

8. In the division at the right, why is 8 written in tens place? (92)



9. In the division shown in question 8, two division facts are used to find the quotient figures. What are these two facts? (93)

10. Make a dot drawing to show that 3 is not the quotient for $2\overline{)60}$. Where should 3 be written in the quotient? Why? (92, 93)

Use folded paper. Write the quotients as fast as you can read the division questions. (82)

11. $6\overline{)54}$ $8\overline{)56}$ $9\overline{)81}$ $6\overline{)36}$

12. $7\overline{)63}$ $9\overline{)45}$ $7\overline{)56}$ $9\overline{)63}$

13. $9\overline{)54}$ $4\overline{)36}$ $8\overline{)72}$ $9\overline{)36}$

14. $8\overline{)64}$ $6\overline{)54}$ $8\overline{)24}$ $9\overline{)72}$

15. $4\overline{)28}$ $8\overline{)32}$ $7\overline{)35}$ $6\overline{)24}$

16. How would you study any of the division facts you found difficult? (83)

Copy. Divide. Check by multiplying. (98)

17. $4\overline{)63}$ $5\overline{)95}$ $7\overline{)28}$ $7\overline{)87}$

18. $9\overline{)58}$ $4\overline{)99}$ $8\overline{)82}$ $3\overline{)90}$

19. $5\overline{)79}$ $3\overline{)54}$ $2\overline{)61}$ $6\overline{)95}$

20. $6\overline{)39}$ $5\overline{)85}$ $7\overline{)85}$ $6\overline{)45}$

21. $3\overline{)44}$ $2\overline{)57}$ $5\overline{)54}$ $7\overline{)65}$

Show That You Know

1. Five boys decided to go on a camping trip. They figured the trip would cost $85 in all. How much should each of the 5 boys pay, if they share the cost equally?

2. Mary made 42 sandwiches for a picnic. She said each child would get 3 sandwiches. How many children did she expect to go to the picnic?

3. If there are 7 days in a week, how many weeks are there in 91 days?

4. Mr. Dunn owes $95 on a $375 refrigerator that he bought. If he pays $5 a week, in how many weeks can he pay the $95 that he still owes?

5. There were 35 children in an arithmetic class. The teacher asked them to work in groups of 8 children. How many groups will there be and how many children will be left over?

6. An airplane flew at a rate of 435 miles per hour. At this rate, how many miles will it fly in 3 hours?

7. Mrs. Jones bought 12 towels at $.59 each. What did she pay for all the towels?

8. Mrs. Smith was shopping. She looked at two coats. One coat cost $89.95. The other cost $65.00. What is the difference in the prices of the two coats?

9. Mary got a size 12 coat that cost $39.98. She got a new dress costing $9.95, a pair of shoes costing $7.50, and a raincoat costing $3.00. How much did all these things together cost?

10. Tom had 96 pepper plants. He planted 8 of them in each row. How many rows did he have?

11. The teacher asked 3 boys to carry 51 books to the storeroom. If each boy carried the same number of books, how many did each boy carry?

12. There are 325 pages in the book that Jack is reading. He has read 219 pages. How many pages must he read to finish the book?

13. A man planted 450 trees in his orchard. There were 165 apple trees. The rest were peach trees. How many peach trees did he plant?

14. If you divide 60 apples equally among 5 boys, how many will each receive?